

SHARP SERVICE MANUAL

No. 00ZFO90AARSME



FACSIMILE

MODEL FO-90A

Chapters 1, 3, 7 and 8 of this manual are omitted because they are partly common to the FO-70AAR/50AAR. Please refer to previous service manual (00ZFO70AARSME) for these chapters.

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- PARTS GUIDE

Parts marked with "⚠" are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

SHARP CORPORATION

This document has been published to be used for after sales service only.
The contents are subject to change without notice.

CAUTION FOR BATTERY REPLACEMENT

(Danish)

ADVARSEL !

Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandoren.

(English)

Caution !

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type
recommended by the equipment manufacturer.
Discard used batteries according to manufacturer's
instructions.

(Finnish)

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan
tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden
mukaisesti.

(French)

ATTENTION

Il y a danger d'explosion s' il y a remplacement incorrect
de la batterie. Remplacer uniquement avec une batterie du
même type ou d'un type recommandé par le constructeur.
Mettre au rebut les batteries usagées conformément aux
instructions du fabricant.

(Swedish)

VARNING

Explosionsfare vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent
typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens
instruktion.

(German)

Achtung

Explosionsgefahr bei Verwendung inkorrektter Batterien.
Als Ersatzbatterien dürfen nur Batterien vom gleichen Typ oder
vom Hersteller empfohlene Batterien verwendet werden.
Entsorgung der gebrauchten Batterien nur nach den vom
Hersteller angegebenen Anweisungen.

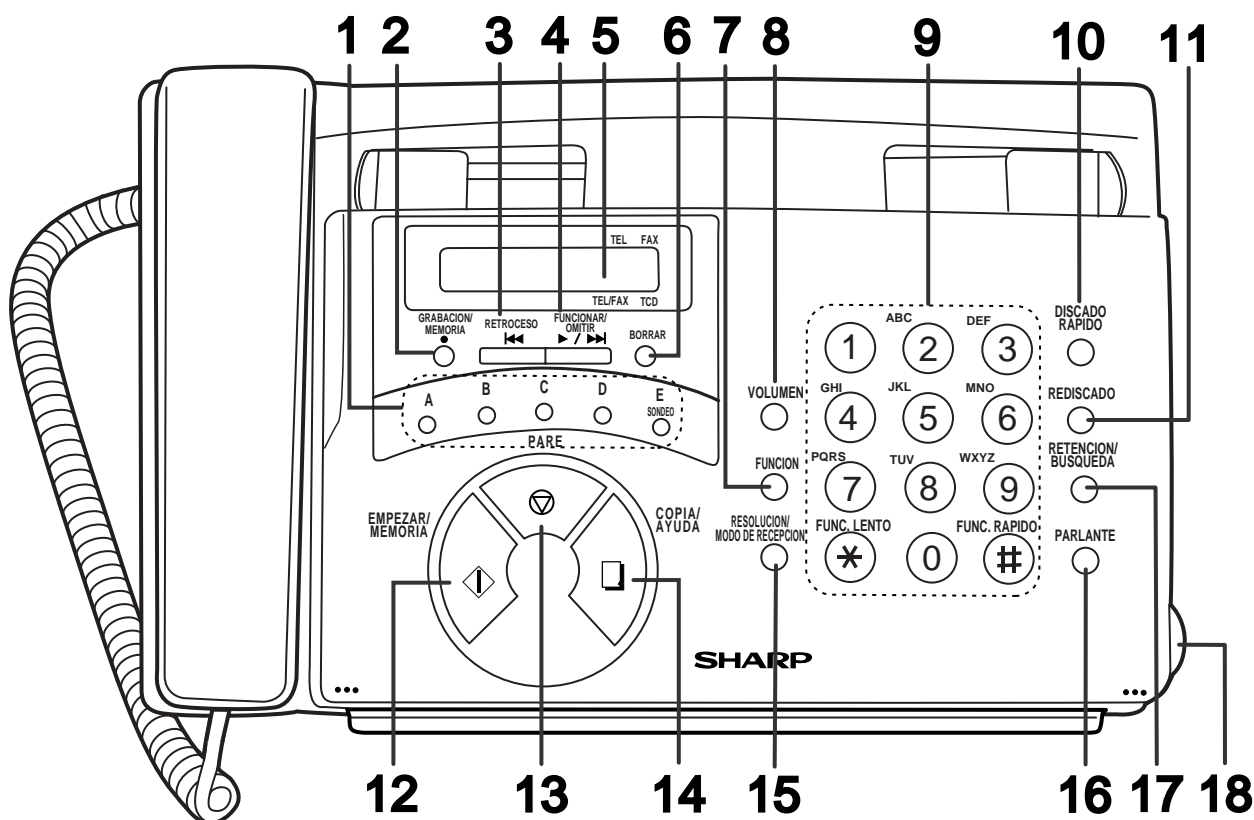
CHAPTER 1. GENERAL DESCRIPTION

[1] Specifications

Automatic dialing:	Rapid Key Dialing: 5 numbers Speed Dialing: 35 numbers	Effective scanning width:	210 mm max.
Fax paper:	Initial starter roll (included with machine): 10 m Recommended replacement roll: FO-20PRw, 30m	Effective printing width:	210 mm max.
Paper cutting method:	Automatic cutter	Contrast control:	Automatic/Dark selectable
Modem speed:	9600 bps with automatic fallback to lower speeds	Reception modes:	Fax, Tel, Tel/Fax, T.C.D
Transmission time* :	Approx. 15 seconds	Copy function:	Yes
Resolution:	Horizontal: 8 dots/mm Vertical: Standard: 3.85 lines/mm Fine/Halftone: 7.7 lines/mm Super fine: 15.4 lines/mm	Telephone function:	Yes (cannot be used if power fails)
Automatic document feeder:	5 pages max. (20 lb paper)	Power requirements:	220-240 V AC, 50/60 Hz
Halftone (grayscale):	64 levels	Operating temperature:	5 - 35°C
Display:	16-digit LCD display	Humidity:	Maximum: 85 % RH
Compression scheme:	MR, MH, Sharp (H2)	Power consumption:	Standby: 2.6 W Maximum: 115 W
Applicable telephone line:	Public switched telephone network	Dimensions:	Width: 304 mm Depth: 236 mm Height: 122 mm
Compatibility:	ITU-T (CCITT) G3 mode	Weight:	Approx. 2.6 kg
Input document size:	Automatic feeding: Width: 148 to 216 mm Length: 140 to 297 mm Manual feeding: Width: 148 to 216 mm Length: 140 to 600 mm	<p>* Based on ITU-T (CCITT) Test Chart #1 at standard resolution in Sharp special mode, excluding time for protocol signals (i.e., ITU-T phase C time only).</p> <p>Note: The facsimile machine is Year 2000 compliant.</p>	

As a part of our policy of continuous improvement, SHARP reserves the right to make design and specification changes for product improvement without prior notice. The performance specifications figures indicated are nominal values of production units. There may be some deviation from these values in individual units.

[2] Operation panel



1. Teclas de discado rápido (Rapid Dial keys)

Press one of these keys to dial a fax or voice number automatically.

2. Tecla GRABACION/MEMORIA (REC/MEMO key)

Press this key to record a phone conversation or a message.

3. Tecla RETROCESO (REPEAT key)

Press this key to repeat playback of a message.

4. Tecla FUNCIONAR/OMITIR (PLAY/SKIP key)

Press this key to play recorded messages. During playback, press it to skip forward to the next message.

5. Pantalla de cristal líquido (Display)

This displays messages and prompts during operation and programming.

6. Tecla BORRAR (DELETE key)

Press this key to erase recorded messages.

7. Tecla FUNCIÓN (FUNCTION key)

Press this key to select various special functions.

8. Tecla VOLUMEN (VOLUME keys)

Press this keys to adjust the volume of the speaker when the **SPEAKER** key has been pressed, the volume of the handset when the handset is lifted, or the volume of the ringer at all other times.

9. Teclas numéricas (Number keys)

Use these keys to dial numbers, and enter numbers and letters when storing auto-dial numbers.

10. Tecla DISCADO RÁPIDO (SPEED DIAL key)

Press this key to dial a fax or voice number using an abbreviated 2-digit Speed Dial number.

11. Tecla REDISCADO (REDIAL key)

Press this key to automatically redial the last number dialed.

12. Tecla EMPEZAR/MEMORIA (START/MEMORY key)

Press this key to send or receive a document, or to scan a document into memory before sending it.

13. Tecla PARE (STOP key)

Press this key to cancel operation before it is completed.

14. Tecla COPIA/AYUDA (COPY/HELP key)

When a document is in the feeder, press this key to make a copy of a document. At any other time, press this key to print out the Help List, a quick reference guide to the operation of your fax machine.

15. Tecla RESOLUCIÓN/MODO DE RECEPCIÓN (RESOLUTION/RECEPTION MODE key)

When a document is in the feeder, press this key to adjust the resolution for faxing or copying. At any other time, press this key to select the reception mode (an arrow in the display will point to the currently selected reception mode).

16. Tecla PARLANTE (SPEAKER key)

Press this key to listen the line and fax tones through the speaker when faxing a document.

Note: **This is not a speakerphone.** You must pick up the handset to talk with the other party.

17. Tecla RETENCIÓN/BÚSQUEDA (HOLD/SEARCH key)

Press this key to search for an auto-dial number, or, during a phone conversation, press this key to put the other party on hold.

18. Liberación del panel (Panel release)

Grasp this finger hold and pull toward you to open the operation panel.

[5] Quick reference guide

ENTERING YOUR NAME AND NUMBER

- Press: **3** **#** **#**
Display shows: **FIJAR # PROPIO**
- Press:
- Enter your fax number (max. of 20 digits) by pressing the number keys.
 - To insert a space between digits, press the **#** key.
 - If you make a mistake, press the **SPEED DIAL** key to backspace and clear the mistake.
- Press:
- Enter your name by pressing the appropriate number keys as shown below.
 - To enter two letters in succession that require the same key, press the **SPEAKER** key after entering the first letter.

SPACE = 1 1	J = 5 5	T = 8 8
A = 2 2	K = 5 5 5	U = 8 8 8
B = 2 2 2	L = 5 5 5 5	V = 8 8 8 8
C = 2 2 2 2	M = 6 6	W = 9 9
D = 3 3	N = 6 6 6	X = 9 9 9
E = 3 3 3	O = 6 6 6 6	Y = 9 9 9 9
F = 3 3 3 3	P = 7 7	Z = 9 9 9 9 9
G = 4 4	Q = 7 7 7	
H = 4 4 4	R = 7 7 7 7	
I = 4 4 4 4	S = 7 7 7 7 7	

- To change case, press the **REDIAL** key.
Press **#** or **×** to scroll through symbols and special characters.

- When finished, press:

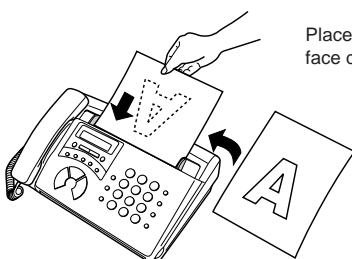
SETTING THE DATE AND TIME

- Press: **3** **#** **#** **#**
Display shows: **FIJAR DIA/FECHA**
- Press:
- Enter two digits for the Day (01 through 31).
- Enter two digits for the Month (01 through 12).
- Enter four digits for the Year (Ex: 2000).
- Enter two digits for the Hour (01 through 23) and two digits for the Minute (00 through 59).
- When finished, press:

STORING AND CLEARING AUTO DIAL NUMBERS

- Press: **3** **#**
Display shows: **MODULO # FAX/TEL**
- Press **1** to store a number or **2** to clear a number.
- Enter a 2-digit Speed Dial number (from 01 to 05 for Rapid Key Dialing, or 06 to 40 for Speed Dialing) (If you are clearing a number, go to Step 7.)
- Enter the full fax/telephone number.
- Press:
- Enter the name of the location by pressing number keys (Refer to the letter entry table in **ENTERING YOUR NAME AND NUMBER**.)
- Press:

SENDING FAXES



Place your document (up to 5 pages) face down in the document feeder.

Normal Dialing

- Lift the handset or press
- Dial the fax number.
- Wait for the reception tone (if a person answers, ask them to press their Start key).
- Press:

Rapid Key Dialing

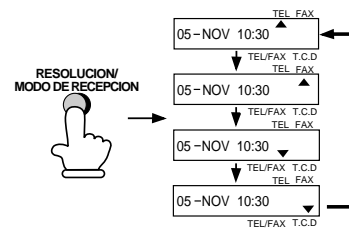
Press the appropriate Rapid Key. Transmission will begin automatically.

Speed Dialing

- Press:
- Enter 2-digit Speed Dial number.
- Press:

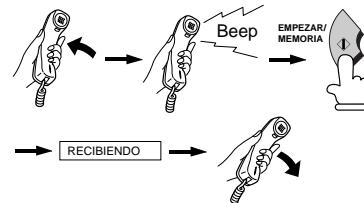
RECEIVING FAXES

Press the **RESOLUTION/RECEPTION MODE** key until the arrow in the display points to the desired reception mode (make sure the document feeder is empty).



FAX mode: The fax machine automatically answers on four rings and receives the incoming document.

TEL mode:



TEL/FAX mode: The fax machine automatically answers on the set number of rings and receives faxes. Voice calls (including manually dialed fax transmissions) are signalled by a special ringing sound.

A.M. mode: Select this mode when you go out to receive both voice messages and faxes.

SETTING THE DISPLAY LANGUAGE

- Press: **4** **#** **#** **#**
- Press:
- Press the **#** key or **×** key until the desired language appears in the display.
- Press:
- Press:

RECORDING AN OUTGOING MESSAGE

- Press: **0** **#**
Display shows: **OGM RECORDING**
- Press:
- Press **1** (GENERAL) to record an outgoing message for the answering machine. Press **2** (TRANSFER) to record an outgoing message for the Transfer function.
- Pick up the handset, press the **START/MEMORY** key, and speak into the handset to record your message.
- When finished, press the **STOP** key or replace the handset.
- Press:

MEMO

CHAPTER 2. ADJUSTMENTS

[1] Adjustments

General

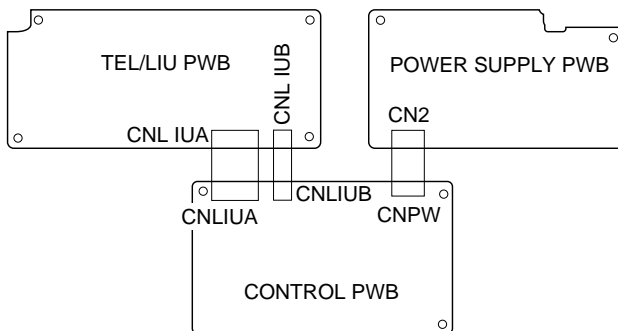
Since the following adjustments and settings are provided for this model, make adjustments and/or setup as necessary.

1. Adjustments

Adjustments of output voltage (FACTORY ONLY)

1. Install the power supply unit in the machine.
2. Set the recording paper and document.
3. When the document is loaded, power is supplied to the output lines. Confirm that outputs are within the limits below.

Output voltage settings



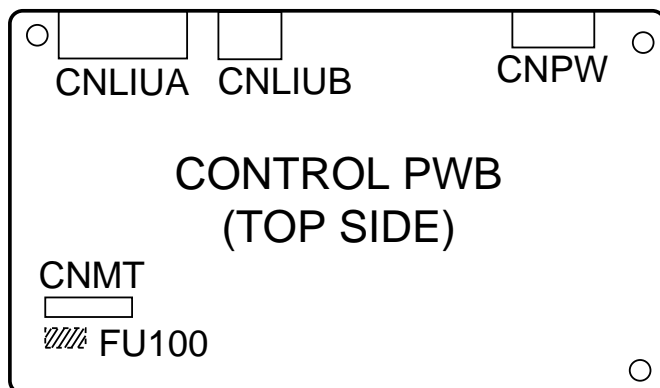
Output	Voltage limits
+5V	4.75V ~ 5.25V
+24V	24.0V ~ 26.0V

Connector No.	CNPW
Pin No.	
1	DG
2	+5V
3	MG
4	MG
5	+24V
6	+24V
7	DG
8	PSAVE

2. IC protectors replacement

ICPs (IC Protectors) are installed to protect the motor driver circuit. ICPs protect various ICs and electronic circuits from an overcurrent condition.

The location of ICPs are shown below:



- (1) FU100 (KAB2402) is installed in order to protect IC's from an over-current generated in the motor drive circuit. If FU100 is open, replace it with a new one.

3. Settings

Dial mode selector

DIAL mode (Soft Switch No. SWB4 DATA No. 2)

(step 1) Select "FIJAR OPCIONES".

KEY : **FUNCION** ④

DISPLAY: **FIJAR OPCIONES** ⇌ **OPRIMA × O #**

(step 2) Select "MODO DISCADO".

KEY: Push **#** until "**MODO DISCADO**" is indicated because the number of **#**'s changes by the model.

Cursor
When initially registering,
the mode shows 1=TONE.
When registering again, the
mode which was registered
formerly is shown.

DISPLAY: **MODO DISCADO** ⇌ **1=TONO, 2=PULSO**

(step 3) Select, using "1" or "2".

KEY: ①

DISPLAY: **TONO SELECC**

KEY: ②

DISPLAY: **PULSO SELECC**

(step 4) End, using the "PARE" key.

KEY: **PARE**

4. Volume setting

You can adjust the volume of the speaker, ringer, and handset using the **VOLUME** key.

(1) Speaker

- ① Press the **SPEAKER** key.
- ② Press the **VOLUME** key one or more times to select the desired level.

The display will show:

VOLUMEN:[■■■■]

- ③ Press the **SPEAKER** key once again to turn off the speaker.

(2) Ringer

- ① Press the **VOLUME** key to select the desired volume. (Make sure the **SPEAKER** key has not been pressed and the handset is not lifted.)

The display will show:

VOLUMEN TIMBRE

- ② If you want to turn off the ringer, continue to press the **VOLUME** key until **RINGER OFF: OK?** appears in the display, and then press the **START** key.

[2] Diagnostics and service soft switch

1. Operating procedure

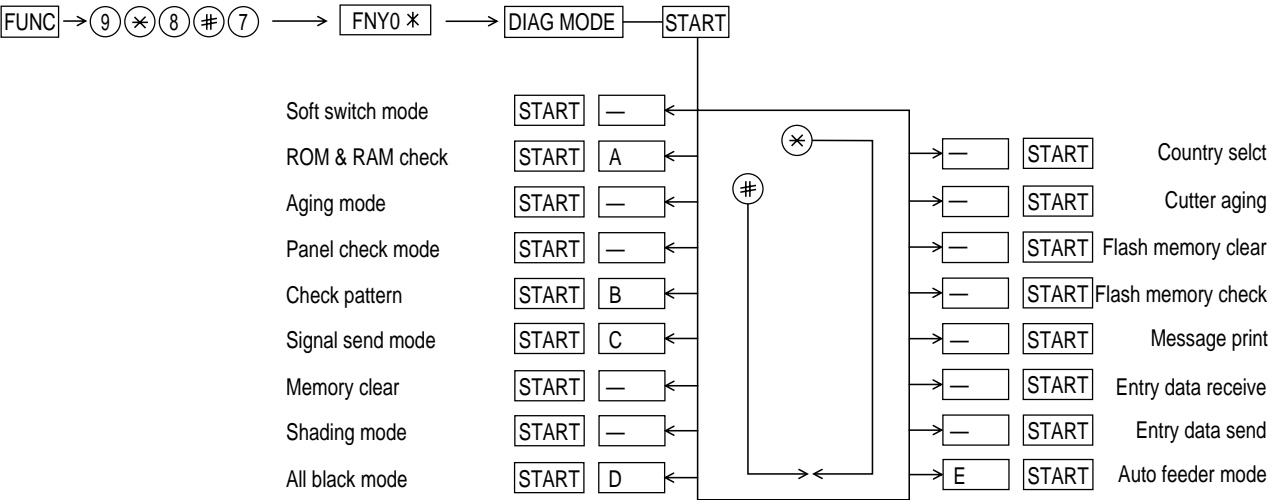
(1) Entering the diagnostic mode

Press **FUNC** → **9** → ***** → **8** → **#** → **7** , and the following display will appear.

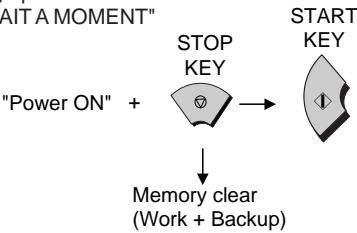
ROM Ver. FNY0 * After 2 sec: **DIAG MODE**
FNY0 *

Then press the **START** key and country name selected by country select will appear. Select the desired item with the ***** key or the **#** key or select with the direct key. Enter the mode with the **START** key.

(Diag•specifications)



If the diag mode cannot be set, repeat the diag mode operation, per-forming the following operation. After the power is turned on and "WAIT A MOMENT" is indicated, press the STOP key.



In relation with the process response (request from Production Engineering) "WAIT A MOMENT" clock indication may appear depending on STOP key timing. If the STOP key is held down, "MEMORY CLEAR?" appears.

2. Diagnostic items

ITEM No.	DIRECT key	Contents	Function
1	—	SOFT SWITCH MODE	Soft switches are displayed and changed. List can be output.
2	A	ROM & RAM CHECK	ROM is sum-checked, and RAM is matched. Result list is output.
3	—	AGING MODE	10 sheets of check patterns are output every 5 minutes per sheet.
4	—	PANEL CKECK MODE	Panel keys are tested. Result list is output.
5	B	CHECK PATTERN	2 sheets of check patterns are output.
6	C	SIGNAL SEND MODE	Various signals of FAX communication are output.
7	—	MEMORY CLEAR	Back-up memory is cleared, and is set at delivery.
8	—	SHADING MODE	Shading compensation is performed in this mode.
9	D	ALL BLACK PRINT	To check the print head, whole dots are printed over the interval of 2 m.
10	E	AUTO FEEDER MODE	Insertion and discharge of document are tested.
11	—	ENTRY DATA SEND	Registered content is sent.
12	—	ENTRY DATA RECEIVE	Registered content is received, and its list is output.
13	—	MESSAGE PRINT	The display message of each language is printed out together with the English equivalent.
14	—	FLASH MEMORY CHECK	Checks flash memory write/read.
15	—	FLASH MEMORY CLEAR	Checks flash memory clearing.
16	—	CUTTER AGING	Recording paper is successively cut.
17	—	COUNTRY SELECT	The software parameter that it agreed in each country name is set up.

3. Diagnostic items description

3. 1. Soft switch mode

The soft switches are provided so that each operation mode can be set by using the operation panel.

In this mode, these switches can be checked and set.

The contents of these switches are backed up.

The available soft switches are SW-A1 to SW-K1.

The content of soft switches is shown in page 2-5 to 2-18.

The contents are set to factory default settings.

3. 2. ROM & RAM check

ROM executes the sum check, and RAM executes the matching test. The result will be notified with the number of short sounds of the buzzer as well as by printing the ROM & RAM check list.

Number of short sounds of buzzer 0 → No error

1 → ROM error

2 → RAM error (32Kbyte)

3. 3. Aging mode

If any document is first present, copying will be executed sheet by sheet. If no document is present, the check pattern will be printed sheet by sheet. This operation will be executed at a rate of one sheet per 5 minutes, and will be ended at a total of 10 sheets.

3. 4. Panel check mode

This mode is used to check whether each key operates properly or not. Press the key on the operation panel, and the key will be displayed on the display. Therefore, press all keys. At this time, finally press the STOP key.

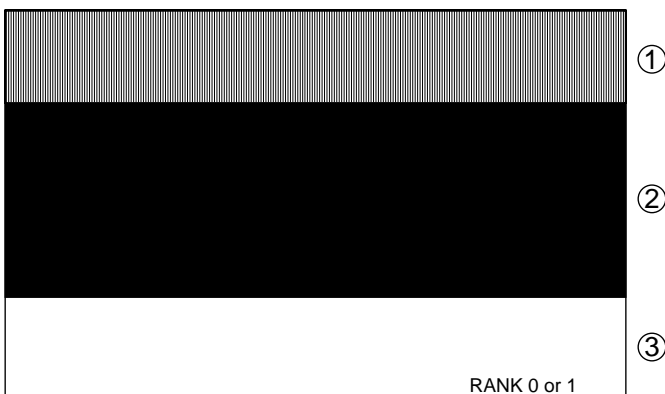
When the STOP key is pressed, the keys which are not judged as "pressed" will be printed on the result list.

- LED part of the contact image sensor (CIS) is kept on during the term from when "START" of the panel test mode to end with the STOP key.

3. 5. Check pattern

This mode is used to check the status of print head. Two sheets of check pattern are printed. The following information of check pattern is printed.

- | | |
|--|---------------|
| ① Vertical stripes (alternate white and black lines) | Approx. 35 mm |
| ② Full black | Approx. 70 mm |
| ③ Full white | Approx. 35 mm |



Note:

There is a selection RANK 0 or 1 depending on resistance value of the thermal head. RANK 0 or RANK 1 is printed at the tail of check pattern to identify.

3. 6. Signal send mode

This mode is used to send various signals to the circuit during FAX communication. Every push of START key sends a signal in the following sequence. Moreover, the signal sound is also output to the speaker when the line monitor of the soft switch is on.

- [1] No signal (CML signal turned on)
- [2] 9600bps
- [3] 7200bps
- [4] 4800bps
- [5] 2400bps
- [6] 300bps (FLAG)
- [7] 2100Hz (CED)
- [8] 1100Hz (CNG)
- [9] Pseudo Ring (models with auto TEL/FAX changeover function)
- [10] END

3. 7. Memory clear

This mode is used to clear the backup memory and to reset to the factory default settings.

The content of each setting will be cleared.

Note: Be sure to execute the memory clear mode whenever you change the country select setting. The default settings of the soft switches vary according to the destinations. Therefore, if you do not execute the memory clear after changing the country select setting, some functions may not work.

3. 8. Shading mode

The mode is used for the shooting compensation. For reading, set up the special original paper.

The shooting compensation memorizes the reference data of white and black for reading.

Moreover, the memorized data is not erased even if memory clear mode is executed.

3. 9. All black print

This mode is used to check the state of the printing head and intentionally overheat it. Whole dots are printed over the interval of 2 m. If it is overheated or the printing sheet is jammed, press STOP key for the end.

3. 10. Auto feeder mode

In this mode, a document is inserted and discharged to check the auto feed function.

After this mode is started, set a document, and the document feed will be automatically tested.

3. 11. Entry data send

This mode is used to send the registered data to the other machine and to make the other machine copy the registered content. Before sending in this mode, it is necessary to set the other machine at the entry data receive mode.

The contents to be sent are as follows (the machine prints each list after the transmission has completed):

- 1. Telephone list data
- 2. Sender (cover sheet) register data
- 3. Optional setting content
- 4. Soft switch content
- 5. Junk fax number list
- 6. Country setting content

3. 12. Entry data receive

This mode is used to receive the registered data from the other machine and to make your machine register the received data. Before receiving in this mode, it is necessary to set the other machine at the entry data send mode.

After receiving is completed, the machine prints the following lists:

- 1. Telephone list data
- 2. Soft switch list
- 3. Junk fax number list

3. 13. Message print

In this mode, all the message data, which are used for displaying indication and list print, are printed as a contrast table of the selected language and English.

3. 14. Flash memory check

Data is written into and read from the flash memory to check the data conformity. When the unit enters this mode, the check is started.

3. 15. Flash memory clear

Data in the flash memory is cleared (memory clear). When the unit enters this mode, the check is started.

*Operation of hardware and signal in the flash memory check mode and flash memory clear mode, and the result of check.

The result is announced by the buzzer beeps. The result of check is printed.

Beeps

- 0 → No error
- 1 → Memory error

4. How to make soft switch setting

To enter the soft switch mode, press the following key entries in sequence.

Press FUNCTION 9 * 8 # 7 START START

↓

DATA No. 1 2 3 4 5 6 7 8

S F T SW-A1 = 0 0 0 0 0 0 0 0

S F T SW-A1 = 1 0 0 0 0 0 0 0

S F T SW-A1 = 1 0 0 0 0 0 0 0

S F T SW-A1 = 1 0 0 0 0 0 0 0

S F T SW-A1 = 1 0 0 0 0 0 0 0

S F T SW-A2 = 0 0 0 0 0 0 0 0

S F T SW-K1 = 0 0 0 0 0 0 0 0

Press FUNCTION key.

Press # key.

Press * key.

Bit1 - 8 are set.

Press START key during setting.

Soft SW-A2 - SW-K1 are set.

•To finish the settings halfway between SW-A1 and SW-K1, press the STOP key. In this case, the setting being done to the SW No. on display will be nullified while settings done to the preceding SW Nos. remain in effect.

•When the COPY key is pressed, the contents of soft switches are printed.

The soft switch mode is terminated.

3. 16. Cutter aging

This mode is used to consecutively cut the recording paper about 10 mm long and to display the number of cutting times.

(The number of cutting times is cumulatively counted unless you execute the memory clear.)

The operation is stopped in the following cases:

- 1. Hold down the stop key. (The cutter aging is stopped.)
- 2. No recording paper. (The cut operation is stopped.)
- 3. Recording paper jam. (The cut operation is stopped.)

3. 17. Country select

This mode is used to set line connecting parameters which correspond to each destination.

When the country select mode is selected, and then the START key is pressed, the destination (country name) currently set will be displayed.

By pressing the # or ✕ key, selectable destinations (country names) are displayed. When the destination (country name) you want to choose is displayed, press the START key. Each parameter will be stored in RAM.

Destinations (Country names) you can select are as follows:

COUNTRY NAME	
LATIN AMERICA (LA/LU)	
ARGENTINA	(AR)

Note: Be sure to execute the memory clear mode whenever you change the country select setting. The default settings of the soft switches vary according to the destinations. Therefore, if you do not execute the memory clear after changing the country select setting, some functions may not work.

Do not set a country select setting which is different from that of the destination of the machine. Some functions will not work because the function and the PWB specifications are different.

5. Soft switch description

• Soft switch

SW NO.	DATA NO.	ITEM	Switch setting and function				Initial setting	Remarks	
			1		0				
SW I A1	1	Protect from echo	No		Yes		0		
	2	Forced 4800bps reception	Yes		No		0		
	3	Footer Print	Yes		No		0		
	4	Length limitation of copy/send/receive	No limit		Copy/Send:60cm Receive:1.5m		0		
	5	CSI transmission	Not transmitted		Transmitted		0		
	6	DIS receive acknowledgement during G3 transmission	Twice		NSF:Once DIS:Twice		0		
	7	Non modulated carrier for V29 transmission mode	Yes		No		0		
	8	Reserved					1		
SW I A2	1 2 3 4	Modem speed		V.29		V.27 ter		0 0 0 1	
				9600bps	7200bps	4800bps	2400bps		
			No. 1	0	0	0	0		
			No. 2	0	0	0	0		
			No. 3	0	1	1	0		
		No. 4	1	1	0	0			
	5	Reserved					1		
	6	H2 mode	No		Yes		0		
	7	Communication error treatment in RTN sending mode(Reception)	No communication error		Communication error		0		
8	CNG transmission	No		Yes		0			
SW I A3	1 2	CED tone signal interval		1000ms	750ms	500ms	75ms	0 0	
			No. 1	1	1	0	0		
			No. 2	1	0	1	0		
	3	MR Coding	No		Yes		0		
	4	Reserved					0		
	5	Reserved					0		
	6	Reserved					0		
	7	Reserved					0		
8	Reserved					0			
SW I A4	1	Signal Transmission level (0~-31 dBm setting by 1dBm step)	Binary input				0		
	2		No. = 16 8 4 2 1				1		
	3		1 2 3 4 5				0		
	4		0 1 0 1 0				1		
	5						0		
6	Protocol monitor(Error print)	Printed at com. error		Not printed		0			
7	Protocol monitor	Yes		No		0			
8	Line monitor	Yes		No		0			
SW I A5	1 2	Digital equalization setting(Reception)		7.2km		0km		1 1	
			No. 1	1		0			
			No. 2	1		0			
	3 4	Digital equalization setting(Transmitter)		7.2km		0km		0 0	
			No. 3	1		0			
			No. 4	1		0			
	5 6	Digital equalization setting(Reception for Caller ID)		7.2km		0km		0 0	
			No. 5	1		0			
			No. 6	1		0			
	7	Error criterion	10 ~ 20 %		5 ~ 10 %		0		
8	Anti junk fax check	Yes		No		1			

SW NO.	DATA NO.	ITEM	Switch setting and function					Initial setting	Remarks
			1		0				
SW I A6	1	Auto gain control(MODEM)	Enable		Disable			1	
	2	End Buzzer	Yes		No			1	
	3	Disconnect the line when DIS is received in RX mode	No		Yes			1	
	4	Equalizer freeze control(MODEM)	On		Off			0	
	5	Equalizer freeze control 7200 bps only	No		Yes			0	
	6	CNG transmission in manual TX mode	Yes		No			1	
	7	Initial compression scheme for sharp fax in TX mode	MR mode		H2 mode			0	
	8	Modem speed automatic down when RX level is under -40dBm	Yes		No			0	
SW I A7	1 2	EOL detect timer		5 seconds	13 seconds	20 seconds	25 seconds	0 1	
			No. 1	0	0	1	1		
			No. 2	0	1	0	1		
	3	Reserved						0	
	4	Reserved						0	
	5	Reserved						0	
	6	Reserved						0	
	7	Reserved						0	
8	Reserved						0		
SW I B1	1	Hold key	Enable		Disable			1	
	2	Auto dial fax transmission by REDIAL key	Yes		No			0	
	3	Reserved						0	
	4	Recall interval (0~15.5min setting by 0.5min step)	Binary input					0	
	5		No. = 16 8 4 2 1					1	
	6		4 5 6 7 8					0	
	7		0 1 0 1 0					1	
	8							0	
SW I B2	1	Recall times(0~15times setting)	Binary input					0	
	2		No. = 8 4 2 1					0	
	3		1 2 3 4					1	
	4		0 0 1 0					0	
	5	Dial tone detection(Before auto dial)	No		Yes			1	
	6	Reserved						0	
	7	Busy tone detection(After auto dial)	No		Yes			1	
	8	Busy tone detection pulse number (After auto dial)	4 pulses		2 pulses			0	
SW I B3	1 2	Waiting time after dialing		45 seconds	55 seconds	90 seconds	140 seconds	0 0	
			No. 1	0	0	1	1		
			No. 2	0	1	0	1		
	3	Reserved						0	
	4	Reserved						0	
	5	Reserved						0	
	6	Reserved						0	
	7	Reserved						0	
8	Reserved						0		
SW I B4	1	Dial pausing(sec/pause)	4 sec		2 sec			0	
	2	Dial mode	Tone		Pulse			1	OPTION
	3	Pulse → Tone change function by ✕ key	Enable		Disable			0	
	4	Dial pulse make/break ratio(%)	40/60		33/67			1	
	5 6	Auto dial mode Delay timer of before line connect		0 second	1.5 seconds	3.0 seconds	4.5 seconds	0 0	
			No. 5	0	0	1	1		
	6		No. 6	0	1	0	1		
	7	Reserved						0	
8	Reserved						0		

SW NO.	DATA NO.	ITEM	Switch setting and function										Initial setting	Remarks
			1					0						
SW B5		Auto dial mode Delay timer of after line connect		1.7s	2.0s	2.5s	3.0s	3.6s	4.0s	5.5s	7.0s			
	1		No. 1	0	0	0	0	1	1	1	1	0		
	2		No. 2	0	0	1	1	0	0	1	1	0		
	3		No. 3	0	1	0	1	0	1	0	1	0		
	4	Fax signal detection after telephone mode dial	Yes					No					0	
	5	Recalling fixed only one time when dialing was unsuccessful without detecting busy tone signal	Yes					No					0	
	6	Reserved											0	
	7	Reserved											0	
	8	Reserved											0	
SW B6	1	DTMF signal transmission level	Binary input										0	
	2	(Low frequency 0~15.5dBm setting	No. = 16 8 4 2 1										1	
	3	by 0.5dBm step)	1 2 3 4 5										1	
	4		0 1 1 1 0										1	
	5												0	
	6	Reserved											0	
	7	Reserved											0	
	8	Reserved											0	
SW B7	1	DTMF signal transmission level	Binary input										0	
	2	(High frequency 0~15.5dBm setting	No. = 16 8 4 2 1										1	
	3	by 0.5dBm step)	1 2 3 4 5										0	
	4		0 1 0 1 0										1	
	5												0	
	6	Reserved											0	
	7	Reserved											0	
	8	Reserved											0	
SW C1		Reading Slice(Binary)		Factory setting		Dark		Light		Daker in dark				
	1		No. 1	0		0		1		1		0		
	2		No. 2	0		1		0		1		0		
		Reading Slice(Half tone)		Factory setting		Dark		Light		Daker in dark				
	3		No. 3	0		0		1		1		0		
	4		No. 4	0		1		0		1		0		
	5	Line density selection	Fine					Standard					0	
	6	Reserved											0	
	7	MTF correction in half tone mode	No					Yes					0	
	8	Reserved											0	
SW D1	1	Number of rings for auto receive	Binary input										0	OPTION
	2	(0~15rings setting)	No. = 8 4 2 1										1	
	3		1 2 3 4										0	
	4		0 1 0 0										0	
	5	Automatic swiching manual to auto receive function	Yes					No					0	
		CI detect frequency		As PTT		11.5Hz		13.0Hz		20.0Hz				
	6		No. 6	0		0		1		1		0		
	7		No. 7	0		1		0		1		0		
	8	Reserved											0	

SW NO.	DATA NO.	ITEM	Switch setting and function								Initial setting	Remarks	
			1				0						
SW I D2	1	Reserved									0		
	2	Reserved									0		
	3	Reserved									0		
	4	Reserved									0		
	5	Reserved									0		
	6	Caller ID function	Yes				No				0	OPTION	
	7	Reserved									0		
	8	Reserved									0		
SW I D3	1	CI off detection timer	Binary input								0		
	2	(0~1550ms setting by 50ms step)	No. = 16 8 4 2 1								1		
	3		1 2 3 4 5								1		
	4		0 1 1 1 0								1		
	5										0		
	6	Reserved									0		
	7	Reserved									0		
	8	Reserved									0		
SW I D4	1	DTMF type Caller ID RX level	Binary input								1		
	2	(0~44dBm setting by 1dBm step)	No. = 32 16 8 4 2 1								0		
	3		1 2 3 4 5 6								1		
	4		1 0 1 1 0 0								1		
	5										0		
	6										0		
	7	Reserved									0		
	8	Reserved									0		
SW I E1	1	Pseudo ringing time at the TEL/FAX automatic switching mode		9sec	15sec	30sec	60sec	90sec	120sec	150sec	180sec	0	
	2		No. 1	0	0	0	0	1	1	1	1		
	3		No. 2	0	0	1	1	0	0	1	1		
	3		No. 3	0	1	0	1	0	1	0	1		
	4	Number of CNG signal detection at the TEL/FAX automatic switching mode	Twice				Once				1		
	5	CNG detect time at TEL/FAX mode	3 sec				5 sec				0		
	6	Post answer tone(TEL/FAX mode)	No				Yes				1		
	7	Type of post answer tone	LA-SI-DO tone				800Hz single tone				1		
	8	Pseudo ringer ON/OFF cycle	1 sec ON / 4 sec OFF				1 sec ON / 2 sec OFF				0		
SW I E2	1	Pseudo ringer sound output level to the line	Binary input								1		
	2	(0~15dBm setting by 1dBm step)	No. = 8 4 2 1								0		
	3		1 2 3 4								1		
	4		1 0 1 0								0		
	5	Post answer tone transmission level	Binary input								1		
	6	(0~15dBm setting by 1dBm step)	No. = 8 4 2 1								0		
	7		5 6 7 8								1		
	8		1 0 1 0								0		
SW I E3	1	Reserved									0		
		Action select when DTMF "#" is received during phone/fax automatic switching mode		No Action		No Action		A.M. Remote operation		Disconnect line		1	
	2		No. 2	0		0		1		1			
	3		No. 3	0		1		0		1			
	4	Reserved									0		
	5	Reserved									0		
	6	Reserved									0		
	7	Reserved									0		
	8	Reserved									0		

SW NO.	DATA NO.	ITEM	Switch setting and function					Initial setting	Remarks		
			1		0						
SW F1		DTMF detection time		50ms	80ms	100ms	120ms	0			
	1	No. 1	0	0	1	1					
	2	No. 2	0	1	0	1					
	3	Protection of remote reception(5 × ×) detection	Yes			No			0		
	4	Remote reception with GE telephone	Compatible			Not compatible			1		
	5	Remote operation code figure by external	Binary input						0	OPTION	
	6	TEL (0~9)	No. = 8 4 2 1						1		
	7		5 6 7 8						0		
8		0 1 0 1						1			
	1	CNG detection in STAND-BY mode	Yes			No			1	OPTION	
SW F2		Number of CNG detect(AM mode)		1 pulse	2 pulses	3 pulses	4 pulses	0			
	2	No. 2	0	0	1	1					
	3	No. 3	0	1	0	1					
		Number of CNG detect(STAND-BY mode)		1 pulse	2 pulses	3 pulses	4 pulses	0			
	4	No. 4	0	0	1	1					
	5	No. 5	0	1	0	1					
	6	Reserved							0		
	7	Reserved							0		
8	Reserved							0			
SW G1	1	Reserved							0		
	2	Reserved							0		
	3	Reserved							0		
	4	Reserved							0		
	5	Reserved							0		
	6	Reserved							0		
	7	Reserved							0		
	8	Reserved							0		
SW G2	1	Reserved							0		
	2	Reserved							0		
	3	Reserved							0		
	4	Reserved							0		
	5	Reserved							0		
	6	Reserved							0		
	7	Reserved							0		
	8	Reserved							0		
SW G3	1	Reserved							0		
	2	Reserved							0		
	3	Reserved							0		
	4	Reserved							0		
	5	Reserved							0		
	6	Reserved							0		
	7	Reserved							0		
	8	Reserved							0		
SW G4	1	Quiet detect level setting	Binary input						1		
	2	(0~44dBm setting by 1dBm step)	No. = 32 16 8 4 2 1						0		
	3		1 2 3 4 5 6						1		
	4		1 0 1 1 0 0						1		
	5								0		
	6								0		
	7	Fax switching when A.M. full	Yes			No			0		OPTION
	8	Reserved							0		

SW NO.	DATA NO.	ITEM	Switch setting and function					Initial setting	Remarks	
			1		0					
SW I H1	1	Busy tone continuous sound detect time	5sec		10sec			1		
	2	Busy tone detect continuation sound detect during OGM	No		Yes			0		
	3	Busy tone detect continuation sound detect	No		Yes			0		
	4	Busy tone detect intermittent sound detect during OGM	No		Yes			0		
	5	Busy tone detect intermittent sound detect	No		Yes			0		
	6	Busy tone detection pulse number		2pulses	4pulses	6pulses	10pulses	0		
			No. 6	0	0	1	1			
			No. 7	0	1	0	1			
8	Reserved						0			
SW I H2	1	Busy tone detection ON/OFF time (Lower duration)		150ms	200ms	250ms	350ms	0		
			No. 1	0	0	1	1			
			No. 2	0	1	0	1			
	3	Busy tone detection ON/OFF time (Upper duration)		650ms	900ms	1500ms	2700ms	0		
			No. 3	0	0	1	1			
			No. 4	0	1	0	1			
	5	Busy tone continuation sound detect frequency	320Hz-570Hz			320Hz-460Hz			0	
	6	Reserved							0	
7	Reserved							0		
8	Reserved							0		
SW I I1	1	ICM recording time		4min	15s	30s	60s	0	OPTION	
			No. 1	0	0	1	1			
			No. 2	0	1	0	1			
	3	A.M. Quiet time 1		2s	3s	4s	5s	0		
			No. 3	0	0	1	1			
			No. 4	0	1	0	1			
	5	A.M. Quiet time 2		0s	1s	2s	3s	1		
			No. 5	0	0	1	1			
No. 6			0	1	0	1				
7	Key input buzzer on/off switch (Two way recording mode)	On			Off			0		
8	Reserved							0		
SW I I2	1	A.M. Quiet detect time	Binary input					0		
			No. = 16 8 4 2 1							
			1 2 3 4 5							
			0 0 1 1 0							
	6	Reserved							0	
	7	Reserved							0	
	8	Reserved							0	
SW I I3	1	Reserved							0	
	2	Max OGM record time	15s			60s			0	
	3	2way record function	Disable			Enable			0	
	4	Toll saver	Disable			Enable			0	OPTION
	5	FAX reception in case of detecting No sound detect after ICM recording	Yes			No			1	
	6	Reserved							0	
	7	Reserved							0	
	8	Transfer dial recall	Disable			Enable			0	

SW NO.	DATA NO.	ITEM	Switch setting and function					Initial setting	Remarks
			1		0				
SW I4		AGC Maximum Gain (line) 10~25dB (1dB step)	Binary input						
	1		No. = 8 4 2 1					1	
	2		1 2 3 4					1	
	3		1 1 0 0					0	
	4							0	
	5	AGC Maximum Gain (mic) 10~25dB (1dB step)	Binary input						
	6		No. = 8 4 2 1					1	
	7		5 6 7 8					1	
8		1 1 1 1					1		
SW I5	1	AGC Eref access code (line) -0~-30dB (2dB step)	Binary input						
	2		No. = 8 4 2 1					1	
	3		1 2 3 4					1	
	4		1 1 0 1					0	
	5							1	
	6	AGC Eref access code (mic) -0~-30dB (2dB step)	Binary input						
	7		No. = 8 4 2 1					1	
	8		5 6 7 8					1	
9		1 1 1 1					1		
SW I6	1	AGC Gain Adaptation Threshold (line)	Binary input						
	2		No. = 8 4 2 1					1	
	3		1 2 3 4					1	
	4		1 1 1 1					1	
	5							1	
	6	AGC Gain Adaptation Threshold (mic)	Binary input						
	7		No. = 8 4 2 1					1	
	8		5 6 7 8					1	
9		1 1 1 1					1		
SW I7	1	AGC Slew Rate (line)		Slow	Normal	Little fast	Fast	0	
	2		No. 1	0	0	1	1		
	3		No. 2	0	1	0	1		
	4	AGC Slew Rate (mic)		Slow	Normal	Little fast	Fast	0	
	5		No. 3	0	0	1	1		
	6		No. 4	0	1	0	1		
	7	Reserved						0	
	8	Reserved						0	
9	Reserved						0		
10	Reserved						0		
SW I8	1	OGM/ICM output level (0~~31dBm setting by 1dBm step)	Binary input						
	2		No. = 16 8 4 2 1					0	
	3		1 2 3 4 5					0	
	4		0 0 1 0 1					1	
	5							0	
	6	AM OGM announce only mode	Yes			No		0	OPTION
	7	Reserved						0	
	8	Reserved						0	

SW NO.	DATA NO.	ITEM	Switch setting and function					Initial setting	Remarks	
			1		0					
SW I J1	1	Sender's phone number setting	Cannot change			Change allowed			0	
	2	Reserved							1	
	3	Ringer volume		Off	Low	Middle	High	1	OPTION	
	4		No. 3	0	0	1	1	0		
		No. 4	0	1	0	1				
	5	Reserved							0	
	6	Reserved							0	
	7	Polling key	Yes			No			0	OPTION
8	Reserved							0		
SW I J2	1	Reserved							0	
	2	Reserved							0	
	3	Speaker volume		Very Low	Low	Middle	High	Very High	0	OPTION
	4		No. 3	0	0	0	0	1	1	
	5		No. 4	0	0	1	1	0	0	
		No. 5	0	1	0	1	0			
	6	Reserved							0	
	7	Saving energy start timing	5sec			180sec			0	
8	Saving energy mode	Enable			Disable			1		
SW I J3	1	Communication results printout (Transaction report)		Error	Send only	Always	No print	0	OPTION	
	2		No. 1	0	0	0	0	0		
	3		No. 2	0	0	1	1	0		
		No. 3	0	1	0	1				
	4	Time format	12 hour			24 hour			1	
	5	Date format	Month-Day-Year			Day-Month-Year			1	
	6	Reserved							0	
	7	Reserved							0	
8	Reserved							0		
SW I K1	1	Entering diag mode by pressing SPEED key	Yes			No			0	
	2	Reserved							0	
	3	Reserved							0	
	4	Reserved							0	
	5	Reserved							0	
	6	Reserved							0	
	7	Reserved							0	
	8	Reserved							0	

• Soft switch function description

SW-A1 No. 1 Protect from echo

Used to protect from echo in reception.

SW-A1 No. 2 Forced 4800BPS reception

When line conditions warrant that receptions take place at 4800 BPS repeatedly.

It may improve the success of receptions by setting at 4800BPS.

This improves the receiving document quality and reduces handshake time due to fallback during training.

SW-A1 No. 3 Footer print

When set to "1", the date of reception, the sender machine No., and the page No. are automatically recorded at the end of reception.

SW-A1 No. 4 Length limitation of copy/send/receive

Used to set the maximum page length.

To avoid possible paper jam, the page length is normally limited to 0.6 meter for copy or transmit, and 1.5 meters for receive.

It is possible to set it to "No limit" to transmit a long document, such as a computer print form, etc. (In this case, the receiver must also be set to no limit.)

SW-A1 No. 5 CSI transmission

(CSI TRANSMISSION) is a switch to set whether the machine sends or does not send the signal (CSI signal) informing its own telephone No. to the remote fax machine when information is received. When "nonsending" is set, the telephone No. is not output on the remote transmitting machine if the remote transmitting machine has the function to display or print the telephone No. of receiving machine, using this CSI signal.

SW-A1 No. 6 DIS receive acknowledgment during G3 transmission

Used to make a choice of whether reception of DIS(NSF) is acknowledged after receiving two DIS(NSFs) or receiving one DIS (two NSF). It may be useful for overseas communication to avoid an echo suppression problem, if set to 1.

SW-A1 No. 7 Non modulated carrier for V29 transmission mode

Though transmission of a nonmodulated carrier is not required for transmission by the V29 modem according to the CCITT Recommendation, it may be permitted to a send nonmodulated carrier before the image signal to avoid an echo suppression problem.

It may be useful for overseas communication to avoid an echo suppression problem, if set to 1.

SW-A1 No. 8 Reserved

Set to "1".

SW-A2 No. 1 ~ No. 4 Modem speed

Used to set the initial modem speed. The default is 9600BPS.

It may be necessary to program it to a slower speed when frequent line fallback is encountered, in order to save the time required for fallback procedure.

SW-A2 No. 5 Reserved

Set to "1".

SW-A2 No. 6 H2 mode

Used to determine reception of H2 mode (15 sec transmission mode).

When set to OFF, H2 mode reception is inhibited even though the transmitting machine has H2 mode function.

SW-A2 No. 7 Communication error treatment in RTN sending mode (Reception)

Used to determine communication error treatment when RTN is sent by occurrence of a received image error in G3 reception. When it is set to "1", communication error is judged as no error.

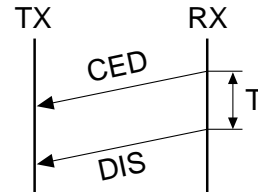
SW-A2 No. 8 CNG transmission

When set to "0", this model allows CNG transmission by pressing the Start key in the key pad dialing mode. When set to "1", CNG transmission in the key pad dialing mode cannot be performed. In either case, CNG transmission can be performed in the auto dial mode.

SW-A3 No. 1, No. 2 CED tone signal interval

For international communication, the 2100Hz CED tone may act as an echo suppression switch, causing a communication problem.

Though SW-A3 No. 1 and No. 2 are normally set to 0, this setting is used to change the time between the CED tone signal to eliminate the communication caused by echo.



SW-A3 No. 3 MR coding

Used to select the MR coding enable or disable.

SW-A3 No. 4 ~ No. 8 Reserved

Set to "0".

SW-A4 No. 1 ~ No. 5 Signal transmission level (0~-31 dBm setting by 1dBm step)

Used to control the signal transmission level in the range of -0dB to -31dB.

The factory setting is at -11dB(HK), -9dB(SG) (MODEM output).

SW-A4 No. 6 Protocol monitor (Error Print)

If set to "1", protocol is printed at communication error.

SW-A4 No. 7 Protocol monitor

Normally set to "0". If set to "1", communication can be checked, in case of trouble, without using a G3 tester or other tools.

When communication FSK data transmission or reception is made, the data is taken into the buffer. When communication is finished, the data is analyzed and printed out. When data is received with the line monitor (SW4-No. 8) set to "1" the reception level is also printed out.

SW-A4 No. 8 Line monitor

Normally set to "0". If set to "1", the transmission speed and the reception level are displayed on the LCD. Used for line tests.

SW-A5 No. 1, No. 2 Digital equalization setting (Reception)

Line equalization when reception is to be set according to the line characteristics.

Setting should be made according to distance between the telephone and the telephone company central switching station.

SW-A5 No. 3, No. 4 Digital equalization setting (Transmitter)

Line equalization when transmission is to be set according to the line characteristics.

Setting should be made according to distance between the telephone and the telephone company central switching station.

SW-A5 No. 5, No. 6 Digital equalization setting (Reception for Caller ID)

Line equalization when reception for CALLER ID is to be set according to the line characteristics.

Setting should be made according to distance between the telephone and the telephone company central switching station.

SW-A5 No. 7 Error criterion

Used to select error criterion for sending back RTN when receiving image data.

SW-A5 No. 8 Anti junk fax check

When using the Anti junk fax function, set to "1".

SW-A6 No. 1 Auto gain control(MODEM)

When this mode is enabled, if the reception signal level is under 31dBm, the modem itself controls the signal gain automatically.

SW-A6 No. 2 End buzzer

Setting this bit to 0 will disable the end buzzer (including the error buzzer/on-hook buzzer).

SW-A6 No. 3 Disconnect the line when DIS is received in RX mode

Bit1 = 0 : When DIS signal is received during RX mode, disconnect the line immediately.

Bit1 = 1 : When DIS signal is received during RX mode, wait for the next signal.

SW-A6 No. 4 Equalizer freeze control (MODEM)

This switch is used to perform reception operation by fixing the equalizer control of modem for the line which is always in unfavorable state and picture cannot be received.

* Usually, the control is executed according to the state of line where the equalizer setting is changed always.

SW-A6 No.5 Equalizer freeze 7200BPS only

Setting which specifies SW-A6 No. 4 control only in condition of 7200BPS modem speed.

SW-A6 No. 6 CNG transmission in manual TX mode

When set to "1", fax transmit the CNG signal in case of manual transmission mode (User press the START key after waiting for the fax answering signal from handset or speaker).

SW-A6 No. 7 Initial compression scheme for sharp fax in TX mode

When set to "0", if the other fax is Sharp model, fax transmit the document by H2 mode.

When set to "1", even if the other fax is Sharp model, fax transmit the document by MR mode.

SW-A6 No. 8 Modem speed automatic down when RX level is under -40dBm

When set to "1", if fax signal level is under -40dBm during reception, machine selects the slower modem speed automatically.

It is effective when noises occur on the received document due to the long distance communications.

SW-A7 No. 1, No. 2 EOL (End Of Line) detect timer

Used to make a choice of whether to use the 5 or 13 or 20 or 25 seconds timer for detection of EOL.

This is effective to override communication failures with some facsimile models that have longer EOL detection.

SW-A7 No. 3 ~ No. 8 Reserved

Set to "0".

SW-B1 No. 1 Hold key

Used to set YES/NO of holding function by the HOLD key.

SW-B1 No. 2 Auto dial fax transmission by REDIAL key

When set to "1", if original documents are set to the feeder and you press REDIAL key, machine will dial and transmit the documents automatically.

When set to "0", operator needs to press the START key after FAX reception tone is heard.

SW-B1 No. 3 Reserved

Set to "0".

SW-B1 No. 4 ~ No. 8 Recall interval (0~15.5min setting by 0.5min step)

Choice is made for a redial interval for speed and rapid dial calls.

Use a binary number to program this with 0.5min steps. If set to 0 accidentally, 0.5min will be assumed.

SW-B2 No. 1 ~ No.4 Recall times (0~15times setting)

Choice is made as to how many redials there should be.

SW-B2 No. 5 Dial tone detection (Before auto dial)

Used to set YES/NO of dial tone detection in auto dialing.

SW-B2 No. 6 Reserved

Set to "0".

SW-B2 No. 7 Busy tone detection (After auto dial)

Used to set YES/NO of busy tone detection after auto dialing.

SW-B2 No. 8 Busy tone detection pulse number (After auto dial)

Used for detection of busy tone in 2 or 4 pulses.

SW-B3 No. 1, No. 2 Waiting time after dialing

This is waiting time for the opponent's signals after dialing.

45 / 55 / 90 / 140 seconds settings are available.

SW-B3 No. 3 ~ No. 8 Reserved

Set to "0".

SW-B4 No. 1 Dialing pause (sec/pause)

Pauses can be inserted between telephone numbers of direct dial connection. Selection of 4 sec or 2 sec pause is available.

SW-B4 No. 2 Dial mode

When using the pulse dial, set to 0. When using the tone dial, set to 1.

SW-B4 No. 3 Pulse → Tone change function by ✕ key

When setting to 1, the mode is changed by pressing the ✕ key from the pulse dial mode to the tone dial mode.

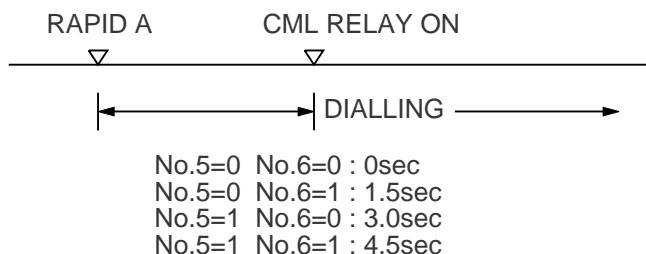
SW-B4 No. 4 Dial pulse make/break ratio (%)

When using the 33% make ratio pulse dial, set to 0.

When using the 40% make ratio pulse dial, set to 1.

SW-B4 No. 5, No. 6 Auto dial mode Delay timer of before line connect

Delay time between the dial key input and line connection under the auto dial mode.

**SW-B4 No. 7, No. 8 Reserved**

Set to "0".

SW-B5 No. 1 ~ No. 3 Auto dial mode Delay timer of after line connect

Delay time between the line connection and dial data output under the auto dial mode.

This setting is available when dial tone detection(SW-B2 No. 5) is set to "NO".



No. 1	No. 2	No. 3	
0	0	0	1.7sec
0	0	1	2.0sec
0	1	0	2.5sec
0	1	1	3.0sec
1	0	0	3.6sec
1	0	1	4.0sec
1	1	0	5.5sec
1	1	1	7.0sec

SW-B5 No. 4 Fax signal detects after telephone mode dial

When set to "1", if machine detects the fax answering signal after telephone calling (handset off-hook or speaker mode dial), machine starts to receive the documents automatically.

SW-B5 No. 5 Recalling fixed only one time when dialing was unsuccessful without detecting busy tone signal

When set to "1", if machine does not detect the busy tone after auto dialing and dialing is unsuccessful, machine will try to recall only one time.

SW-B5 No. 6 ~ No. 8 Reserved

Set to "0".

SW-B6 No. 1 ~ No. 5 DTMF signal transmission level (Low frequency 0~15.5dBm setting by 0.5dBm step)

The transmission level of DTMF signal is adjusted. (lower frequency)

00000: 0dBm

↓

11111: -15.5 dBm (-0.5dBm x 31)

SW-B6 No. 6 ~ No. 8 Reserved

Set to "0".

SW-B7 No. 1 ~ No. 5 DTMF signal transmission level (High frequency 0~15.5dBm setting by 0.5dBm step)

The transmission level of DTMF signal is adjusted. (higher frequency)

00000: 0dBm

↓

11111: -15.5 dBm (-0.5dBm x 31)

SW-B7 No. 6 ~ No. 8 Reserved

Set to "0".

SW-C1 No. 1, No. 2 Reading slice (Binary)

Used to determine the set value of reading density in standard/fine/super-fine mode.

The standard setting is "00"(Factory setting is "00").

SW-C1 No. 3, No. 4 Reading slice (Half tone)

Used to determine the set value of reading density in half tone mode. The standard setting is "00"(Factory setting is "00").

SW-C1 No. 5 Line density selection

Used to set the transmission mode which is automatically selected when the Resolution key is not pressed. In the copy mode, however, the fine mode is automatically selected unless the Resolution key is manually set to another mode.

SW-C1 No. 6 Reserved

Set to "0".

SW-C1 No. 7 MTF correction in half tone mode

This allows selection of MTF correction (dimness correction) in the half tone mode.

When "NO" (=1) is selected, the whole image becomes soft and mild. Clearness of characters will be reduced. Normally set to "YES" (=0).

SW-C1 No. 8 Reserved

Set to "0".

SW-D1 No.1 ~ No. 4 Number of rings for auto receive (0~15rings setting)

When the machine is set in the auto receive mode, the number of rings before answering can be selected. It may be set from one to nine rings using a binary number. Since the facsimile telephone could be used as an ordinary telephone if the handset is taken off the hook, it should be programmed to the user's choice. If the soft switch was set to 1, direct connection is made to the facsimile.

If a facsimile calling beep was heard when the handset is taken off the hook, press the START key and put the handset on the hook to have the facsimile start receiving. If it was set to 0 accidentally, receive ring is set to 1.

NOTE: If the machine is set to answer after a large number of rings, it may not be able to receive faxes successfully.

If you have difficulty receiving faxes, reduce the number of rings to a maximum of 5.

SW-D1 No. 5 Automatic switching manual to auto receive function

This soft switch is used to select whether the machine should switch to the auto receive mode after 5 rings in the manual receive mode or remain in the same way as SW-D1 No. 1, No. 2, No. 3 and No. 4 "0"1"0"1"(5 rings).

SW-D1 No. 6, No. 7 CI detect frequency

Detection frequency of ring signal for auto reception is set.

When set to No. 6=0, No. 7=0, frequency is set to PTT recommendation.

When set to No. 6=0, No. 7=1, frequency is set to 11.5Hz or more.

When set to No. 6=1, No. 7=0, frequency is set to 13.0Hz or more.

When set to No. 6=1, No. 7=1, frequency is set to 20.0Hz or more.

SW-D1 No. 8 Reserved

Set to "0".

SW-D2 No. 1 ~ No. 5 Reserved

Set to "0".

SW-D2 No. 6 Caller ID Function

Used for Caller ID function.

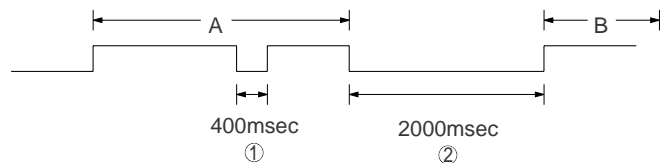
SW-D2 No. 7, No. 8 Reserved

Set to "0".

SW-D3 No. 1 ~ No. 5 CI off detection timer (0~1550ms setting by 50ms step)

Set the minimum time period of CI signal interruption which affords to be judged as a CI OFF section with 50ms steps.

(Example)



0 1 1 1 0 (50ms~14) : 700ms(CI interruption>700ms:Judged as a CI OFF section)

The section 1 is not judged as a CI OFF section, the CI signal A is counted as one signal. The section 2 is judged as a CI OFF section, the CI signal B is considered as the second signal.

0 0 1 1 1 (50ms~7) : 350ms(CI interruption>350ms:Judged as a CI OFF section)

The section 1 is judged as a CI OFF section, and the CI signal A is counted as two signals. The section 2 is judged as a CI OFF section, and the CI signal B is considered as the third signal.

SW-D3 No. 6 ~ No. 8 Reserved

Set to "0".

SW-D4 No. 1 ~ No. 6 DTMF type Caller ID RX level (0~44dBm setting by 1dBm step)

This is used for DTMF type Caller ID detection level setting.

SW-D4 No. 7, No. 8 Reserved

Set to "0".

SW-E1 No. 1 ~ No. 3 Pseudo ringing time at the TEL/FAX automatic switching mode

Choice is made as to how long to rumble the dummy ringer on TEL/FAX automatic switching mode.

SW-E1 No. 4 Number of CNG signal detection at the TEL/FAX automatic switching mode

Used for detection of CNG in one tone or two tones in the TEL/FAX automatic switching mode.

SW-E1 No. 5 CNG detect time at TEL/FAX mode

The switch which sets the time from the start of CNG detection to the end of detection.

SW-E1 No. 6 Post answer tone (TEL/FAX mode)

When set to "0", machine send the tones in TEL/FAX auto changeover mode.

SW-E1 No. 7 Type of post answer tone

When set to "0", post answer tone is 800Hz single tone.

When set to "1", post answer tone is 880Hz/988Hz/1046Hz(LA-SI-DO) tone.

SW-E1 No. 8 Pseudo ringer ON/OFF cycle

When set to "0", pseudo ringer is 1 sec ON and 2 sec OFF cycles.

When set to "1", pseudo ringer is 1 sec ON and 4 sec OFF cycles.

SW-E2 No. 1 ~ No. 4 Pseudo ringer sound output level to the line (0~-15dBm setting by 1dBm step)

Used to adjust the sound volume of pseudo ringer to the line (ring back tone) generated on selecting TEL/FAX.

SW-E2 No. 5 ~ No. 8 Post answer tone transmission level (0~-15dBm setting by 1dBm step)

Used to adjust the sound volume of post answer tone to the line generated on selecting TEL/FAX.

SW-E3 No. 1 Reserved

Set to "0"

SW-E3 No. 2, No. 3 Action select when DTMF "#" is received during phone/fax automatic switching mode**SW-E3 No. 4 ~ No. 8 Reserved**

Set to "0".

SW-F1 No. 1, No. 2 DTMF detection time

Used to set detect time of DTMF (Dual Tone Multi Frequency) used in remote reception(5 × ×).

The longer the detect time is, the less the error detection is caused by noises.

SW-F1 No. 3 Protection of remote reception (5 × ×) detection

Used to set the function of remote reception (5 × ×). When set to "1", the remote reception function is disabled.

SW-F1 No. 4 Remote reception with GE telephone

"1": Compatible with TEL mode by GE

"0": Not compatible

- When sending (5 × ×) for remote reception with a GE manufactured telephone remote reception may not take place because of special specifications in their DTMF.

To overcome this, a soft SW is provided to change the modem setting to allow for remote reception.

- If this soft SW is set to "1", other telephone sets may be adversely affected.

SW-F1 No. 5 ~ No. 8 Remote operation code figure by external TEL (0~9)

Remote operation codes can be changed from 0 through 9. If set to greater than 9, it defaults to 9. The "5 × ×" is not changed.

Ex- 7 × × (Default : 5 × ×)

SW-F2 No. 1 CNG detection in STAND-BY mode

When setting to "1", the CNG signal detection function during standby stops.

SW-F2 No. 2, No. 3 Number of CNG detect (AM mode)

Used for detection of CNG in 1 to 4 pulses.

SW-F2 No. 4, No. 5 Number of CNG detect (STAND-BY mode)

Used for detection of CNG in 1 to 4 pulses.

SW-F2 No. 6 ~ No. 8 Reserved

Set to "0"

SW-G1 No. 1 ~ No. 8 Reserved

Set to "0"

SW-G2 No. 1 ~ No. 8 Reserved

Set to "0"

SW-G3 No. 1 ~ No. 8 Reserved

Set to "0"

SW-G4 No. 1 ~ No. 6 Quiet detect level setting (0~-44dBm setting by 1dBm step)

This is used to change the quiet detect level setting.

If quiet detection is difficult due to noise, reduce this setting level.

(Example)

Factory setting : 1 0 1 1 0 0 (- 44dBm)

↓

1 0 1 0 0 0 (- 40dBm)

SW-G4 No. 7 Fax switching when A.M. full

If the answering machine's memory (tape) is full and there is no response, the machine automatically switches to Fax reception.

SW-G4 No. 8 Reserved

Set to "0".

SW-H1 No. 1 Busy tone continuous sound detect time

Set detecting time busy tone for 5 seconds or 10 seconds.

SW-H1 No. 2 Busy tone detect continuation sound detect during OGM

Used to detect the continuous tone of specific frequency during OGM output.

SW-H1 No. 3 Busy tone detect continuation sound detect

Used to select detection of the continuous sound of certain frequency.

SW-H1 No. 4 Busy tone detect intermittent sound detect during OGM

Used to detect the intermittent tone of specific frequency during OGM output.

SW-H1 No. 5 Busy tone detect intermittent sound detect

Used to select detection of the intermittent sound of certain frequency.

SW-H1 No. 6, No. 7 Busy tone detection pulse number

Used to set detection of Busy tone intermittent sounds.

SW-H1 No. 8 Reserved

Set to "0".

SW-H2 No. 1, No. 2 Busy tone detection ON/OFF time (Lower duration)

The initial value of detection is set according to electric condition.

The set value is changed according to the local switch board. (Erroneous detection of sound is reduced.)

If erroneous detection is caused by sound, etc., adjust the detection range.

The lower limit can be set in the range of 150msec to 350msec.

SW-H2 No. 3, No. 4 Busy tone detection ON/OFF time (Upper duration)

Similarly to SW-H1 No. 1, the set value can be varied.

The upper limit can be set in the range of 650msec to 2700msec.

SW-H2 No. 5 Busy tone continuation sound detect frequency

Set detecting frequency of busy tone continuation sound for 320 ~ 570 Hz of 320 ~ 460 Hz.

SW-H2 No. 6 ~ No. 8 Reserved

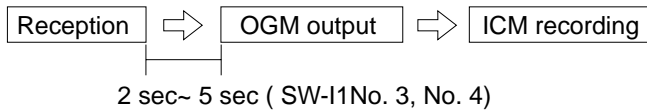
Set to "0".

SW-I1 No. 1, No. 2 ICM recording time

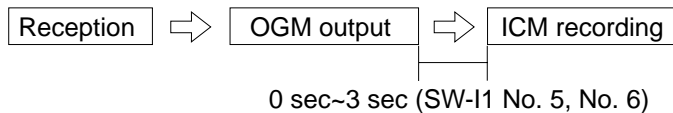
Used to select the incoming message recording time among 15sec/30sec/60sec/4min.

SW-I1 No. 3, No. 4 A.M. quiet time 1

Used to select four kinds of no sound time (2 sec ~ 5 sec) after reception in the T.A.D mode until OGM is output.

**SW-I1 No. 5, No. 6 A.M. quiet time 2**

Used to select four kinds of no sound time (0 sec ~ 3 sec) after OGM output the T.A.D mode until ICM recording is started.

**SW-I1 No. 7 key input buzzer on/off switch (Two way recording mode)**

Used to turn ON/OFF key input buzzer in the TWO-WAY recording mode.

SW-I1 No. 8 Reserved

Set to "0".

SW-I2 No. 1 ~ No. 5 A.M. quiet detect time

Used to set no sound time (0 sec - 32 sec) during the T.A.D. mode operation.

SW-I2 No. 6 ~ No. 8 Reserved

Set to "0".

SW-I3 No. 1 Reserved

Set to "0".

SW-I3 No. 2 Max OGM record time

Used to select the maximum OGM recording time (1=15sec, 0=60sec).

SW-I3 No. 3 Two way record function

If this switch is set to "1", machine doesn't work two way recording function.

SW-I3 No. 4 Toll saver

Used to turn on the toll saver function. If it is off, the reception frequency in the AM mode is identical with that in the FAX mode.

SW-I3 No. 5 FAX reception in case of detecting no sound detect after ICM recording

If this switch is set to "0", machine doesn't change to FAX reception mode when detect no sound in ICM recording.

SW-I3 No. 6, No. 7 Reserved

Set to "0".

SW-I3 No. 8 Transfer dial recall

If this switch is set to "1", machine disable redial in Transfer function.

**SW-I4 No. 1 ~ No. 4 AGC maximum gain (Line)
(10~25dB) (1 dB step)**

The AGC Maximum Gain limits the gain applied by the AGC. Message with average energy below the AGC Energy Reference Level will have their average energy level increased by no more than the AGC Maximum Gain. The AGC Maximum Gain should average energy of the message with the lowest average energy to the AGC Energy Reference Level.

**SW-I4 No. 5 ~ No. 8 AGC maximum gain (Mic)
(10~25dB) (1 dB step)**

The AGC Maximum Gain limits the gain applied by the AGC. Message with average energy below the AGC Energy Reference Level will have their average energy level increased by no more than the AGC Maximum Gain. The AGC Maximum Gain should average energy of the message with the lowest average energy to the AGC Energy Reference Level.

**SW-I5 No. 1 ~ No. 4 AGC eref access code (Line)
(-0~-30dB) (2 dB step)**

The AGC Energy Reference Level controls the playback level. Any message having average speech energy above the energy reference level has its playback level attenuated, and any level has its playback level increased. If the playback level is too high (low), then decreasing (increasing) the AGC energy Reference level will achieve the desired level.

**SW-I5 No. 5 ~ No. 8 AGC eref access code (Mic)
(-0~-30dB) (2 dB step)**

The AGC Energy Reference Level controls the playback level. Any message having average speech energy above the energy reference level has its playback level attenuated, and any level has its playback level increased. If the playback level is too high (low), then decreasing (increasing) the AGC energy Reference level will achieve the desired level.

SW-I6 No. 1 ~ No. 4 AGC gain adaptation threshold (Line)

The AGC adjusts the amount of gain applied to the incoming message only when the average energy exceeds the AGC Gain Adaptation Threshold. The AGC Gain Adaptation Threshold prevents message background noise from corrupting the gain provided that the AGC Gain Adaptation Threshold is greater than the background noise energy. In the event that a message has background noise energy greater than the AGC Gain Adaptation Threshold, the AGC Gain can be no greater than the AGC Maximum Gain. Note that the AGC Gain Adaptation Threshold must always be greater than the RPACS VOX Turn-On Threshold.

SW-I6 No. 5 ~ No. 8 AGC gain adaptation threshold (Mic)

The AGC adjusts the amount of gain applied to the incoming message only when the average energy exceeds the AGC Gain Adaptation Threshold. The AGC Gain Adaptation Threshold prevents message background noise from corrupting the gain provided that the AGC Gain Adaptation Threshold is greater than the background noise energy. In the event that a message has background noise energy greater than the AGC Gain Adaptation Threshold, the AGC Gain can be no greater than the AGC Maximum Gain. Note that the AGC Gain Adaptation Threshold must always be greater than the RPACS VOX Turn-On Threshold.

SW-I7 No. 1, No. 2 AGC slew rate (Line)

The AGC Slew Rate controls the convergence of the message playback level to the desired playback level. A large slew rate will allow faster convergence and a small slew rate will allow slower convergence.

SW-I7 No. 3, No. 4 AGC slew rate (Mic)

The AGC Slew Rate controls the convergence of the message playback level to the desired playback level. A large slew rate will allow faster convergence and a small slew rate will allow slower convergence.

SW-I7 No. 5 ~ No. 8 Reserved

Set to "0".

SW-I8 No. 1 ~ No. 5 OGM/ICM output level

Used to control OGM and ICM output level.

SW-I8 No. 6 AM OGM announce only mode

If this switch is set to 1, the machine is not recording ICM. (disconnect the line after OGM output)

SW-I8 No. 7, No. 8 Reserved

Set to "0".

SW-J1 No. 1 Sender's phone number setting

Used to make a choice of whether the registered sender's phone number can be changed or not. If the switch is set to "1", new registration of the sender's phone number is disabled to prevent accidental wrong input.

SW-J1 No. 2 Reserved

Set to "1".

SW-J1 No. 3, No. 4 Ringer Volume

Used to adjust ringing volume.

SW-J1 No. 5, No. 6 Reserved

Set to "0".

SW-J1 No. 7 Polling key

If this switch is set to 1, the last of Rapid key works as polling key.

SW-J1 No. 8 Reserved

Set to "0".

SW-J2 No. 1, No. 2 Reserved

Set to "0".

SW-J2 No. 3 ~ No. 5 Speaker Volume

Used to adjust sound volume from a speaker.

SW-J2 No. 6 Reserved

Set to "0".

SW-J2 No. 7 Saving energy start timing

Used to set the time between the machine's stand-by state (clock indication) after operation and saving energy mode.

It is possible to set the time to either 5 sec or 180 sec (default).

SW-J2 No. 8 Saving energy mode

Used to select whether to make the saving energy mode valid or not.

**SW-J3 No. 1 ~ No. 3 Communication results printout
(Transaction report)**

It is possible to obtain transaction results after each communication.

Normally, the switch is set (No. 1 : 0, No. 2 : 0, No. 3 : 0) so that the transaction report is produced only when a communication error is encountered.

If No.1 was set to 0 and No. 2 to 1 and No. 3 to 0, the transaction report will be produced every time a communication is done, even if the communication was successful.

Setting No. 1 to 0 and No. 2 to 1 and No. 3 to 1 will disable this function.

No transaction report printed.

SW-J3 No. 4 Time format

When set to "0", 24hour time format is used.

When set to "1", 12hour time format is used.

SW-J3 No. 5 Date format

When set to "0", Day-Month-Year format is used.

When set to "1", Month-Day-Year format is used.

SW-J3 No. 6 ~ No. 8 Reserved

Set to "0".

SW-K1 No. 1 Entering diag mode by pressing SPEED key

A bit which is used in the production process only. When the SPEED key is pressed, the switch is changed from the stand-by state to the diag mode.

SW-K1 No. 2 ~ No. 8 Reserved

Set to "0".

[3] Troubleshooting

Refer to the following actions to troubleshoot any of the problems mentioned in 1-4.

[1] A communication error occurs.

[2] Image distortion produced.

[3] Unable to do overseas communication.

[4] Communication speed slow due to FALLBACK.

- Increase the transmission level SOFT SWITCH A4-1, 2, 3, 4, 5.
May be used in case [1] [2] [3].
- Decrease the transmission level SOFT SWITCH A4-1, 2, 3, 4, 5. May be used in case [3].

- Apply line equalization SOFT SWITCH A5-1, 2.
May be used in case [1] [2] [3] [4].

- Slow down the transmission speed SOFT SWITCH A2-1, 2, 3, 4. May be used in case [2] [3].

- Replace the TEL/LIU PWB.
May be used in all cases.

- Replace the control PWB.
May be used in all cases.

* If transmission problems still exist on the machine, use the following format and check the related matters.

TO: _____ ATT: _____ Ref.No.: _____
 CC: _____ ATT: _____ Date: _____
 FM: _____ Dept: _____
 _____ Sign: _____

***** Facsimile communication problem *****				Ref.No.:																					
From: Mr.		Fax Tel No.:		Date:																					
Our customer	Name			Tel No.																					
	Address			Fax No.																					
	Contact person			Model name																					
Other party	Name			Tel No.																					
	Address			Fax No.																					
	Contact person			Model name																					
Problem mode	Line: Domestic / international		Model: G3	Phase: A, B, C, D.																					
	Reception / Transmission		Automatic reception / Manual reception																						
			Automatic dialing / Manual dialing / Others																						
Frequency:		%	ROM version:																						
Confirmation item				Please mark problem with an X. No problem is: 0.																					
				<table border="1"> <tr> <th>A1</th><th>A2</th><th>B1</th><th>B2</th><th>C1</th><th>C2</th><th>D1</th><th>D2</th><th>E1</th><th>E2</th> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>		A1	A2	B1	B2	C1	C2	D1	D2	E1	E2										
				A1	A2	B1	B2	C1	C2	D1	D2	E1	E2												
Transmission level setting is () dB at our customer																									
Transmission level () dBm Reception level () dBm By level meter at B1 and B2																									
Comment																									
Countermeasure																									
***** Please attach the G3 data and activity report on problem. *****																									

* Please complete this report before calling the "TAC" hotline if problem still occurs.

[4] Error code table

1. Communication error code table

G3 Transmission

Code	Final received signal	Error Condition (Receiver side)
0	Incomplete signal frame	Cannot recognize bit stream after flag
1	NSF, DIS	Cannot recognize DCS signal by echo etc. Cannot recognize NSS signal (FIF code etc)
2	CFR	Disconnects line during reception (carrier missing etc)
3	FTT	Disconnects line by fall back
4	MCF	Disconnects line during reception of multi page Cannot recognize NSS, DCS signal in the case of mode change
5	PIP or PIN	The line is hung up without replying to telephone request from the receiving party.
6	RTN or RTP	Cannot recognize NSS, DCS signal after transmit RTN or RTP signal.
7	No signal or DCN	No response in receiver side or DCN signal received* (transmitter side)
8	—	Owing to error in some page the error could not be corrected although the specified number of error retransmissions were attempted.
11	—	Error occurred after or while reception by the remote (receiving) machine was revealed to be impossible.
12	—	Error occurred just after fallback.
13	—	Error occurred after a response to retransmission end command was received.

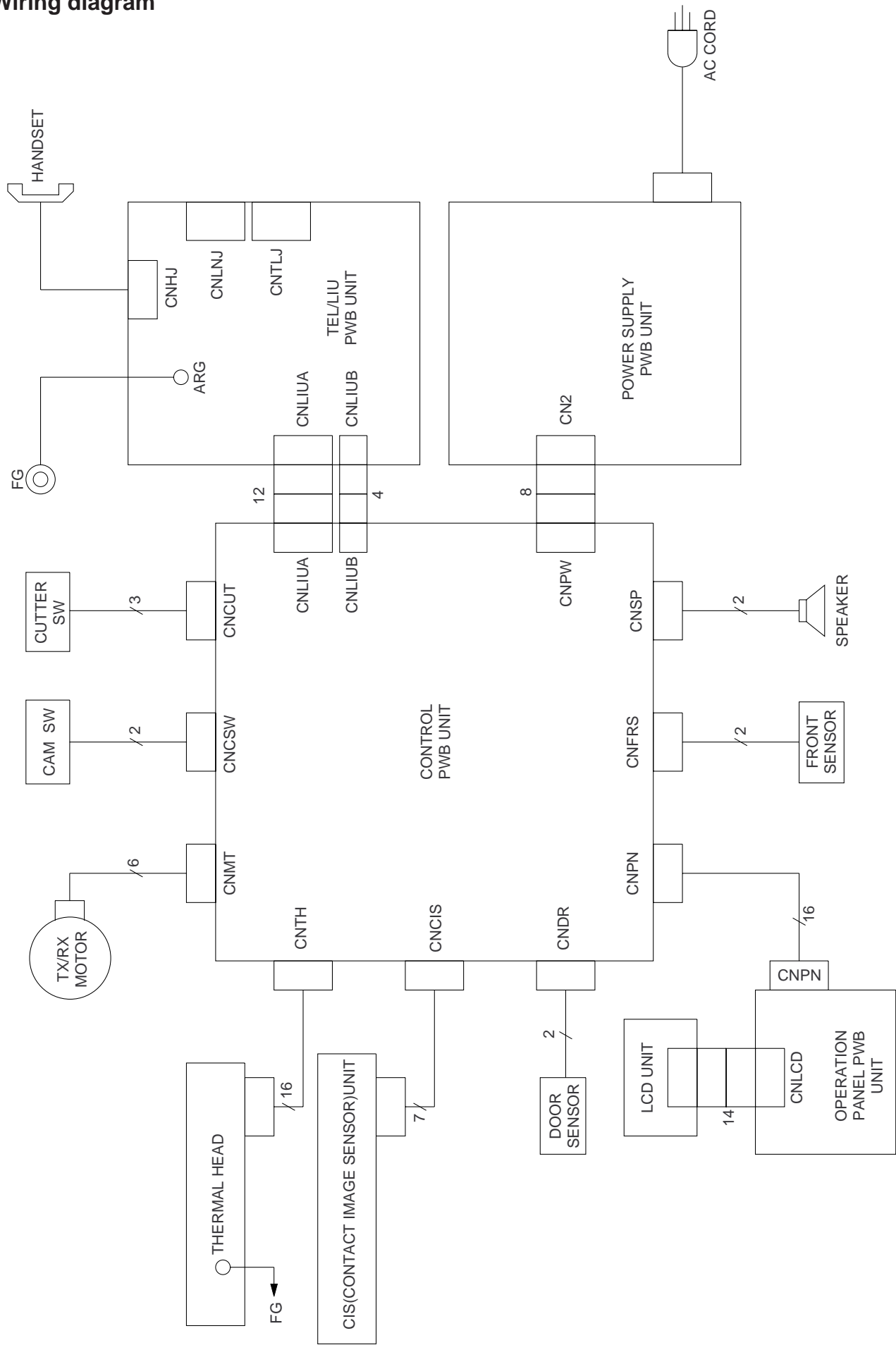
G3 Reception

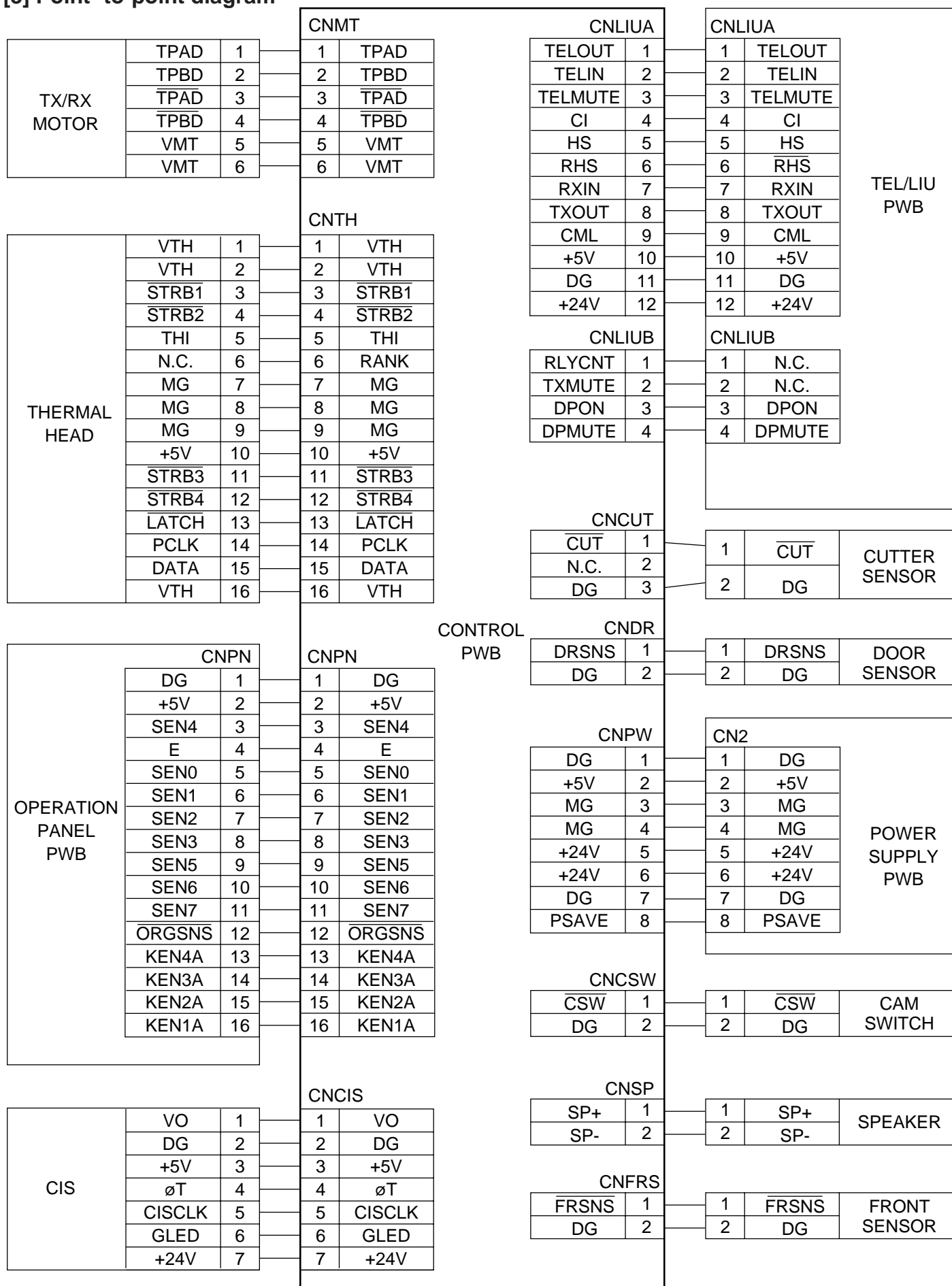
Code	Final received signal	Error Condition (Receiver side)
0	Incomplete signal frame	Cannot recognize bit stream after flag
1	NSS, DCS	Cannot recognize CFR or FTT signal Disconnects line during transmission (line error)
2	NSC, DTC	Cannot recognize NSS signal (FIF code etc)
3	EOP	Cannot recognize MCF, PIP, PIN, RTN, RTP signal
4	EOM	Cannot recognize MCF, PIP, PIN, RTN, RTP signal in the case of mode change
5	MPS	The line is hung up without replying to communication request.
6	PR1-Q	Cannot recognize PIP, PIN signal in the case of TALK request
7	No signal or DCN	No response in transmitter (cannot recognize DIS signal) or DCN signal received* (receiver side)
8	—	Error occurred upon completion of reception of all pages.
9	—	Error occurred when mode was changed or Transmission/Reception switching was performed.
10	—	Error occurred during partial page or physical page reception.
11	—	Error occurred after or during inquiry from the remote (transmitting) machine as to whether reception is possible or not.
12	—	Error occurred during or just after fallback.
13	—	Error occurred after the retransmission end command was received.

MEMO



[2] Wiring diagram



[3] Point- to-point diagram

CHAPTER 5. CIRCUIT DESCRIPTION

[1] Circuit description

1. General description

The compact design of the control PWB is obtained by using CONEXANT fax engine in the main control section and high density printing of surface mounting parts. Each PWB is independent according to its function as shown in Fig. 1.

2. PWB configuration

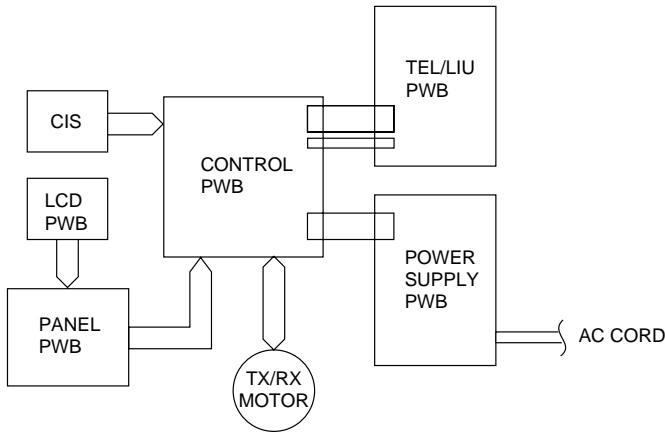


Fig. 1

1) Control PWB

The control PWB controls peripheral PWBs, mechanical parts, transmission, and performs overall control of the unit. This machine employs a 1 chip modem (FM209V) which is installed on the control PWB.

2) TEL/LIU PWB

This PWB controls connection of the telephone line to the unit.

3) Power supply PWB

This PWB provides voltages of +5V and +24V to the other PWBs.

4) Panel PWB

The panel PWB allows input of the operation keys.

5) LCD PWB

This PWB controls the LCD display.

3. Operational description

Operational descriptions are given below:

- Transmission operation

When a document is loaded in standby mode, the state of the document sensor is sensed via the 1 chip fax engine (FC200). If the sensor signal was on, the motor is started to bring the document into the standby position. With depression of the START key in the off-hook state, transmission takes place.

Then, the procedure is sent out from the modem and the motor is rotated to move the document down to the scan line. In the scan processor, the signal scanned by the CIS is sent to the internal image processor and the AD converter to convert the analog signal into binary data. This binary data is transferred from the scan processor to the image buffer within the RAM and encoded and stored in the transmit buffer of the RAM. The data is then converted from parallel to serial form by the modem where the serial data is modulated and sent onto the line.

- Receive operation

There are two ways of starting reception, manual and automatic. Depression of the START key in the off-hook mode in the case of manual receive mode, or CI signal detection by the LIU in the automatic receive mode.

First, the FC200 controls the procedure signals from the modem to be ready to receive data. When the program goes into phase C, the serial data from the modem is converted to parallel form in the modem interface of the 1 chip fax engine (FC200) which is stored in the receive buffer of the RAM. The data in the receive buffer is decoded software-wise to reproduce it as binary image data in the image buffer. The data is DMA transferred to the recording processor within the FC200 which is then converted from parallel to serial form to be sent to the thermal head. The data is printed line by line by the FC200 which is assigned to control the motor rotation and strobe signal.

- Copy operation

To make a copy on this facsimile, the COPY key is pressed when the machine is in stand-by with a document on the document table and the telephone set is in the on-hook state.

First, depression of the COPY key advances the document to the scan line. Similar to the transmitting operation, the image signal from the CIS is converted to a binary signal in the DMA mode via the 1 chip fax engine (FC200) which is then sent to the image buffer of the RAM. Next, the data is transferred to the recording processor in the DMA mode to send the image data to the thermal head which is printed line by line. The copying takes place as the operation is repeated.

[2] Circuit description of control PWB

1. General description

Fig. 2 shows the functional blocks of the control PWB, which is composed of 5 blocks.

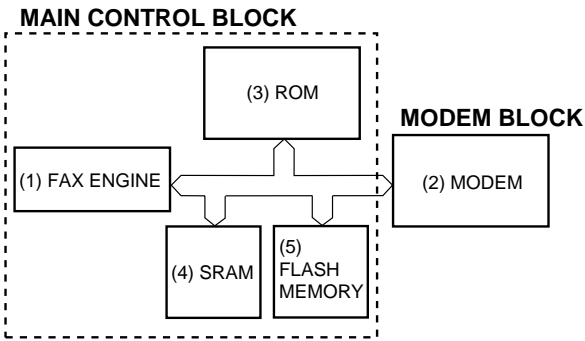


Fig. 2 Control PWB functional block diagram

2. Description of each block

(1) Main control block

The main control block is composed of CONEXANT 1 chip fax engine (FC200), ROM (2Mbit), SRAM (256kbit), FLASH MEMORY (512k × 8 bit) and Modem (FM209V).
Devices are connected to the bus to control the whole unit.

1) FC200 (IC3) : pin-144 QFP (FAX ENGINE)

2) FM209V (IC5) : pin-128 QFP (MODEM)

The FAX ENGINE Integrated Facsimile Controllers.

FC200, contains an internal 8 bit microprocessor with an external 16 Mbyte address space and dedicated circuitry optimized for facsimile image processing and facsimile machine control and monitoring.

3) 27C2000 (IC10): pin-32 DIP (ROM)

ROM of 2 Mbit equipped with software for the main CPU.

4) W24258S-70LE (IC6): pin-28 SOP (SRAM)

Line memory for the main CPU system RAM area and coding/decoding process. Used as the transmission buffer.

Memory of recorded data such as daily report and auto dials. When the power is turned off, this memory is backed up by the lithium battery.

5) KM29W040T (IC4): pin-44 TSOP (FLASH MEMORY)

A 512k × 8 bit NAND FLASH MEMORY to store the voice and image data when using memory functions.

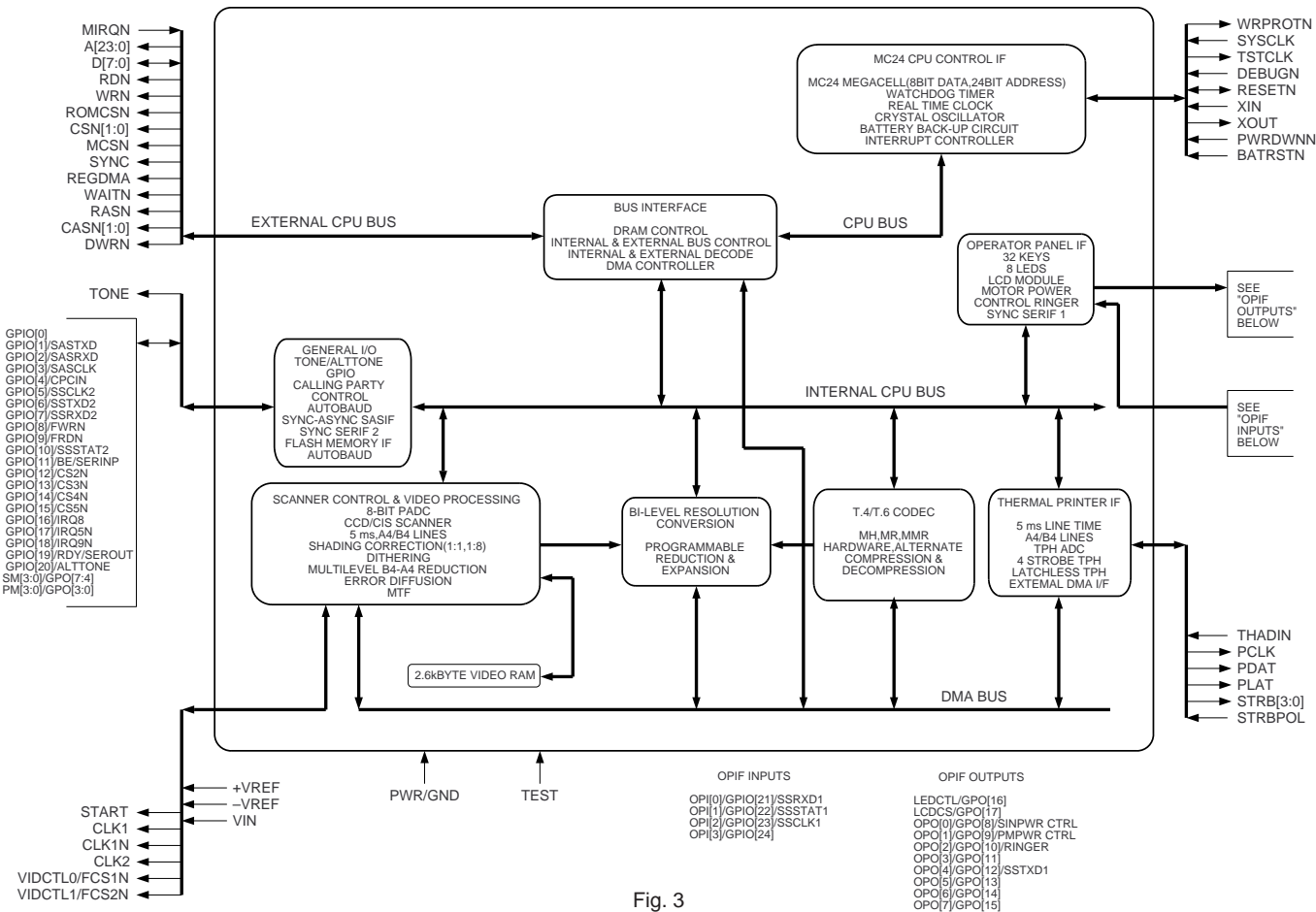


Fig. 3

FC200 (IC3) Terminal descriptions

Pin Name	Pin No.	I/O	Input Type	Output Type	Pin Description (Note: Active low signals have an "n" pin name ending.)
CPU Control Interface					
MIRQn	135	I	HU	–	Modem interrupt, active low. (Hysteresis In, Internal Pullup.)
SYSCCLK	133	I	H	–	System clock. (Hysteresis In.)
TSTCLK	130	O	–	123XT	Test clock.
Bus Control Interface					
A[23:0] 15:20][22:27]	[1:6][8:13]	O	TU	123XT	Address bus (24-bit).
D[7:0] 141:144]	[136:139]	I/O	TU	123XT	Data bus (8-bit).
RDn	128	O	–	123XT	Read strobe.
WRn	127	O	–	123XT	Write strobe.
ROMCSn	120	O	–	123XT	ROM chip select.
CS1n	122	O	–	123XT	I/O chip select.
CS0n	57	O	–	123XT	SRAM chip select. (Battery powered.)
MCSn	121	O	–	123XT	Modem chip select.
SYNC	126	O	–	123XT	Indicates CPU op code fetch cycle (active high).
REGDMA	124	O	–	123XT	Indicates REGSEL cycle and DMA cycle.
WAITn	125	O	–	123XT	Indicates current TSTCLK cycle is a wait state or a halt state.
RASn	113	O	–	123XT	DRAM row address select. (Battery powered.)
CAS[1:0]n	[111:112]	O	–	123XT	DRAM column address select. (Battery powered.)
DWRn	109	O	–	123XT	DRAM write. (Battery powered.)
Prime Power Reset Logic and Test					
DEBUGn	129	I	HU	–	External non-maskable input (NMI).
RESETn	131	I/O	HU	2XO	FC200 Reset.
TEST	58	I	C	–	Sets Test mode (Battery powered).
Battery Power Control and Reset Logic					
XIN	59	I	OSC	–	Crystal oscillator input pin.
XOUT	60	O	–	OSC	Crystal oscillator output pin.
PWRDWNn	62	I	H	–	Used by external system to indicate -to FC200 - loss of prime power. (Results in NMI)
BATRSTn	61	I	H	–	Battery power reset input.
WRPROTn	110	O	–	1XC	(Battery powered.) Write protect during loss of VDD power. NOTE: The functional logic is powered by battery power, but the output drive is powered by DRAM battery power.
Scanner Interface					
START	101	O	–	2XS	Scanner shift gate control.
CLK1	100	O	–	2XS	Scanner clock.
CLK1n	99	O	–	2XS	Scanner clock-inverted.
CLK2	98	O	–	2XS	Scanner reset gate control (or clock for CIS scanner).
FCS1n/VIDCTL0	96	O	–	2XT	Flash memory chip select or Video Control signal.
FCS2n/VIDCTL1	97	O	–	2XT	Flash memory chip select or Video Control signal.
Printer Interface					
PCLK/DMAACK	29	O	–	3XC	Thermal Print Head (TPH) clock, or external DMAACK.
PDAT	30	O	–	2XP	Serial printing data (to TPH).
PLAT	31	O	–	3XP	TPH data latch.
STRB[3:0]	[33:36]	O	–	1XP	Strobe signals for the TPH.
STRBPOL/DMAREQ	37	I	C	–	Sets strobe polarity, active high/low or external DMA request.
Operator Panel Interface					
OPO[0]/GPO[8]/ SMPWRCTRL	47	O	–	2XL	Keyboard/LED strobe [0] or GPO[8] or Scan Motor Power Control
OPO[1]/GPO[9]/ PMPWRCTRL	46	O	–	2XL	Keyboard/LED strobe [1] or GPO[9] or Print Motor Power Control
OPO[2]/GPO[10]/ RINGER	44	O	–	2XCT	Keyboard/LED strobe [2] or GPO[10] or RINGER
OPO[3]/GPO[11]	43	O	–	2XL	Keyboard/LED strobe [3] or GPO[11]
OPO[4]/GPO[12]/ SSTXD1	42	O	–	2XL	Keyboard/LED strobe [4] or GPO[12] or SSTXD1 (for SSIF1)
OPO[5]/GPO[13]	40	O	–	2XL	Keyboard/LED strobe [5] or GPO[13]
OPO[6]/GPO[14]	39	O	–	2XL	Keyboard/LED strobe [6] or GPO[14]
OPO[7]/GPO[15]	38	O	–	2XL	Keyboard/LED strobe [7] or GPO[15]
OPI[0]/GPIO[21]/ SSRXD1	52	I/O	HU	2XC	(Pullup, Hysteresis In) Keyboard return [0] or GPIO[21] or SSRXD1 (for SSIF1)
OPI[1]/GPIO[22]/ SSSTAT1	51	I/O	HU	2XC	(Pullup, Hysteresis In) Keyboard return [1] or GPIO[22] or SSSTAT1 (for SSIF1)

FC200 (IC3) Terminal descriptions

Pin Name	Pin No.	I/O	Input Type	Output Type	Pin Description
Operator Panel Interface					
OPI[2]/GPIO[23]/SSCLK1	50	I/O	HU	2XC	(Pullup, Hysteresis In) Keyboard return [2] or GPIO[23] or SSCLK1 (for SSIF1)
OPI[3]/GPIO[24]	49	I/O	HU	2XC	(Pullup, Hysteresis In) Keyboard return [3] or GPIO[24]
LEDCTL	55	O	–	4XC	Indicates outputs OPO[7:0] are for LEDs.
LCDCS	54	O	–	1XC	LCD chip select.
General Purpose I/O					
GPIO[0]	94	I/O	H	2XC	(Hysteresis In) GPIO[0].
GPIO[1]/SASTXD	93	I/O	H	2XC	(Hysteresis In) GPIO[1] or SASTXD (for SERIF).
GPIO[2]/SASRXD	92	I/O	H	2XC	(Hysteresis In) GPIO[2] or SASRXD (for SERIF).
GPIO[3]/SASCLK	91	I/O	H	2XC	(Hysteresis In) GPIO[3] or SASCLK (for SERIF).
GPIO[4]/CPCIN	90	I/O	H	2XC	(Hysteresis In) GPIO[4] or Calling Party Control Input.
GPIO[5]/SSCLK2	89	I/O	H	2XC	(Hysteresis In) GPIO[5] or SSCLK2 (for SSIF2).
GPIO[6]/SSTXD2	87	I/O	H	2XC	(Hysteresis In) GPIO[6] or SSTXD2 (for SSIF2).
GPIO[7]/SSRXD2	86	I/O	H	2XC	(Hysteresis In) GPIO[7] or SSRXD2 (for SSIF2).
GPIO[8]/FWRn	85	I/O	H	2XC	(Hysteresis In) GPIO[8] or flash write enable signal for NAND-type flash memory.
GPIO[9]/FRDn	84	I/O	H	2XC	(Hysteresis In) GPIO[9] or flash read enable signal for NAND-type flash memory.
GPIO[10]/SSSTAT2	83	I/O	H	2XC	(Hysteresis In) GPIO[10] or SSSTAT2 (for SSIF2).
GPIO[11]/BE/SERINP	82	I/O	H	1XC	(Hysteresis In) GPIO[11] or bus enable or serial port data input for autobaud detection.
GPIO[12]/CS[2]n	80	I/O	H	2XC	(Hysteresis In) GPIO[12] or I/O chip select [2].
GPIO[13]/CS[3]n	79	I/O	H	2XC	(Hysteresis In) GPIO[13] or I/O chip select [3].
GPIO[14]/CS[4]n	78	I/O	H	2XC	(Hysteresis In) GPIO[14] or I/O chip select [4].
GPIO[15]/CS[5]n	77	I/O	H	2XC	(Hysteresis In) GPIO[15] or I/O chip select [5].
GPIO[16]/IRQ[8]	76	I/O	H	1XC	(Hysteresis In) GPIO[16] or external interrupt 8.
GPIO[17]	75	I/O	H	1XC	(Hysteresis In) GPIO[17].
GPIO[18]/IRQ[9]n	74	I/O	H	1XC	(Hysteresis In) GPIO[18] or external interrupt 9.
GPIO[19]/RDY/SEROUT	73	I/O	H	1XC	(Hysteresis In) GPIO[19] or ready signal or Serial port data output for autobaud detection.
GPIO[20]/ALTTONE	107	I/O	H	1XC	(Hysteresis In) GPIO[20] or ALTTONE.
Miscellaneous					
SM[3:0]/GPO[7:4]	[103:106]	O	–	1XC	Programmable: scan motor control pins or GPO pins.
PM[3:0]/GPO[3:0]	[115:118]	O	–	1XC	Programmable: print motor control pins or GPO pins.
TONE	119	O	–	1XC	Tone output signal.
Power, Reference Voltages, Ground					
-Vref/CLREF	66	I	-VR	–	Negative Reference Voltage for Video A/D or Reference Voltage for the Clamp Circuit.
ADXG	68	I	VXG	–	A/D Internal GND. (NOTE: This pin requires an external 0.22µF decoupling capacitor to ADGA.)
ADGA	69		VADG		A/D Analog Ground
ADVA	70		VADV		A/D Analog Power
ADGD	72		VADG		A/D Digital Ground
+Vref	71	I	+VR		Positive Reference Voltage for Video A/D.
VIN	67	I	VA	–	Analog Video A/D input.
THAD1	65	I	TA	–	Analog Thermal A/D input.
Power and Ground					
VSS(12)	7,21,28,45,53,56,64,88,95,108,132,134				Digital Ground
VDD(8)	14,32,41,48,81,102,123,140				Digital Power
VBAT	63				Battery Power
VDRAM	114				DRAM Battery Power

(2) Panel control block

The following controls are performed by the FC200.

- Operation panel key scanning
- Operation panel LCD display

(3) Mechanism/recording control block

- Recording control block diagram (1)

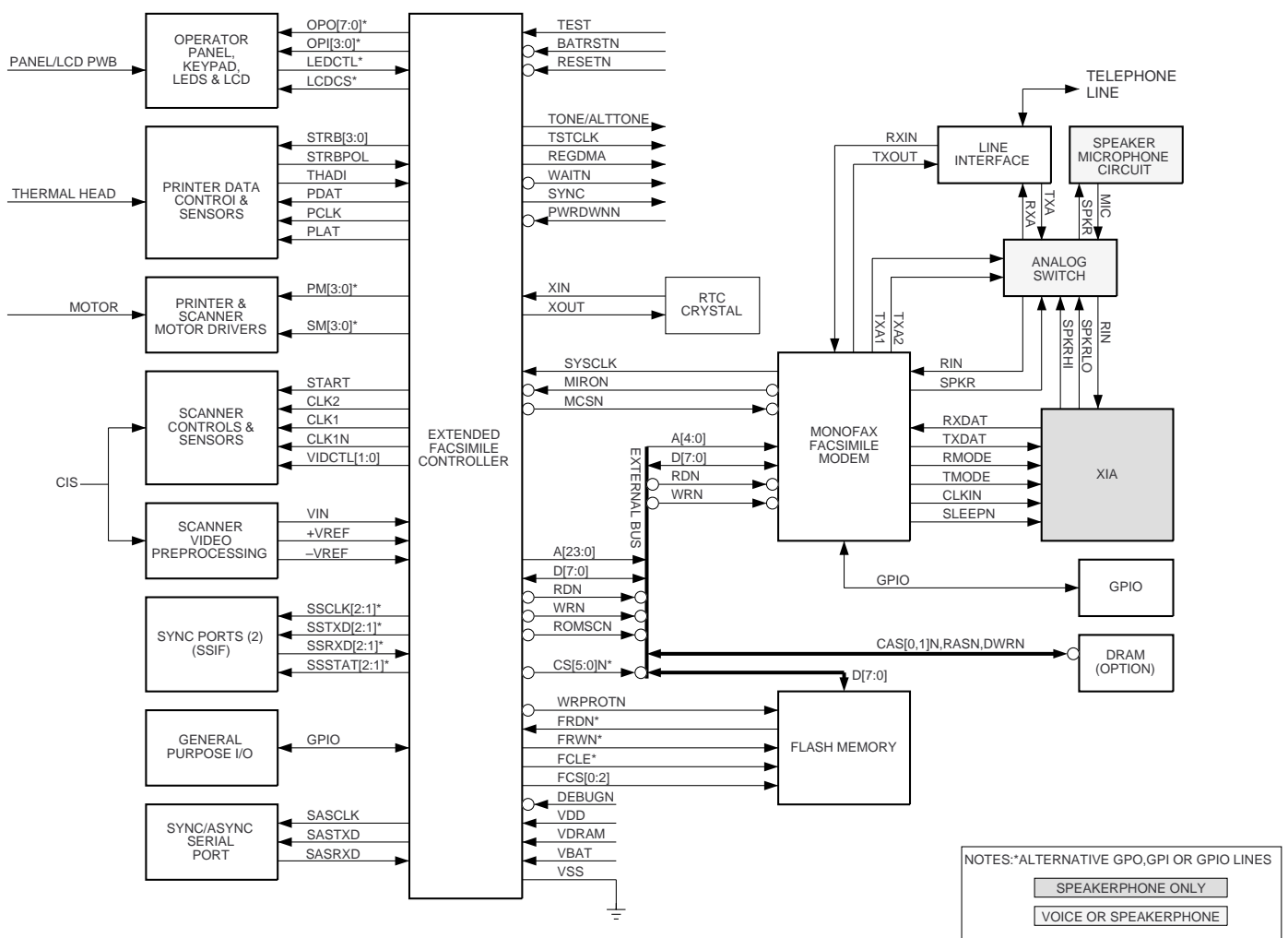


Fig. 4

(4) Modem (FM209V) block

INTRODUCTION

The CONEXANT FM209V MONOFAX modem is a synchronous 9600 bits per second (bps) half-duplex modem with error detection and DTMF reception. It has low power consumption and requires a single +5V and +3.3V DC power supply. The modem is housed in a single VLSI device package.

The modem can operate over the public switched telephone network (PSTN) through line terminations provided by a data access arrangement (DAA).

The FM209V is designed for use in Group 3 facsimile machines.

The modem satisfies the requirements specified in CCITT recommendations V.29, V.27 ter, V.21 Channel 2 and T.4, and meets the binary signaling requirements of T.30.

The modem can operate at 9600, 7200, 4800, 2400, or 300 bps, and also includes the V.27 ter short training sequence option.

The modem can also perform HDLC framing according to T.30 at 9600, 7200, 4800, 2400, or 300 bps.

The modem features a programmable DTMF receiver and three programmable tone detectors which operate concurrently with the V.21 channel 2 receiver.

The voice mode allows the host computer to efficiently transmit and receive audio signals and messages.

The modem is available in either a 128-pin plastic quad flat pack (TQFP). General purpose input/output (GPIO) pins are available for host as signment in the 128-pin TQFP.

The modem's small size, single voltage supply, and low power consumption allow the design of compact system enclosures for use in both office and home environments.

MONOFAX is a registered trademark of CONEXANT.

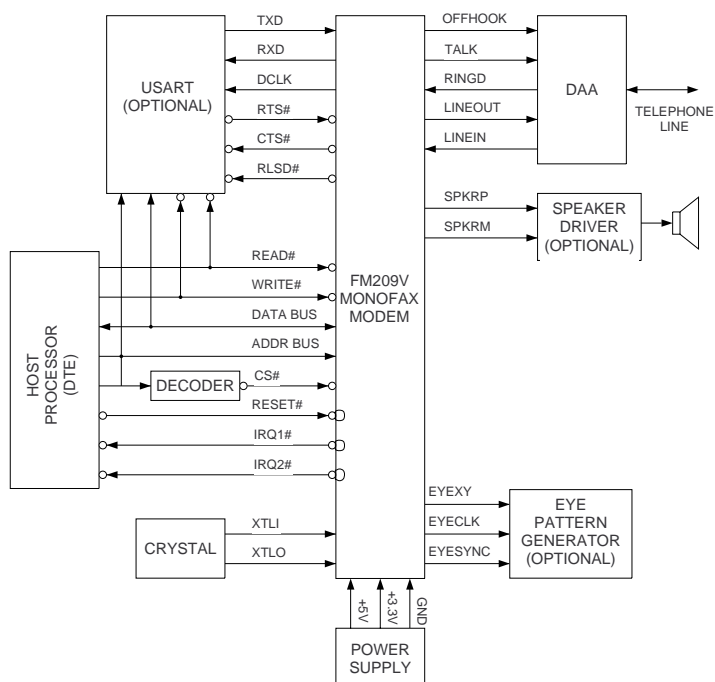


Fig. 5

FEATURES

- Group 3 facsimile transmission/reception
 - ITU-T V.29, V.27 ter, T.30, V.21 Channel 2, T.4
 - ITU-T V.17 and V.27 ter short train
 - HDLC framing at all speeds
 - Receive dynamic range: 0 dBm to -43 dBm
 - Automatic adaptive equalization
 - Fixed and programmable digital compromise equalization
 - DTMF detect and tone detect
 - ITU-T V.21 Channel 2 FSK 7E Flag Detect
 - Ring detector
 - Programmable transmits level
 - Programmable single/dual tone transmission
- V.23 and Type I Caller ID
 - Full-duplex modes:
 - TX = 75 bps. RX = 1200 bps
 - TX = 1200 bps. RX = 75 bps
 - Half-duplex mode:
 - TX = RX = 1200 bps
 - Serial and parallel data modes
 - Programmable parallel data mode
 - 5, 6, 7 or 8 data bits
 - 1 or 2 Stop bits
 - Mark, Space, Even, or Odd Parity
 - Break function
 - Transmitter squelch
 - Compromise equalizer
- Programmable interface memory interrupt
- Eight General Purpose Input (GPI) and eight General Purpose Output (GPO) pins for host assignment
- DTE interface: two alternate ports
 - Selectable microprocessor bus (6500 or 8085)
 - ITU-T V.24 (EIA/TIA-232-E compatible) interface
- TTL and CMOS compatible
- 3.3V/5V operation
- Power consumption
 - Operating Mode: 200 mW (Basic), 275 mW (-V option), 300 mW (-VS option)
 - Sleep Mode: 1 ma (Basic, -V option and -VS option)
- Packaging
 - 128-pin TQFP (thin quad flat pack)

FM209V (IC5) Hardware Interface Signals**Pin Signals – 128-Pin TQFP**

Pin No.	Signal Name	I/O Type	Pin Description
1	SR4IN/RESERVED	MI	Modem Interconnect
2	SR3OUT/RESERVED	MI	Modem Interconnect
3	EYESYNC	OA	Eye Pattern Circuit
4	EYECLK	OA	Eye Pattern Circuit
5	RXD	OA	DTE serial interface
6	SR1IO	MI	Modem Interconnect
7	NC	—	No Connection
8	EYEXY	OA	Eye Pattern Circuit
9	SR4OUT	MI	Modem Interconnect
10	VDD1	PWR	3.3V Digital Supply for DSP
11	RLSD#	OB	DTE Serial Interface
12	DCLK	OB	DTE Serial Interface
13	EN85#	IA	Host Parallel Interface
14	GPI0	IA	Host Parallel Interface
15	RTS#	IA	DTE Serial Interface
16	DGND1	GND	DSP Digital Ground
17	TXD	IA	DTE Serial Interface
18	SA1CLK	MI	Modem Interconnect
19	RS4	IB	Host Parallel Interface
20	RS3	IB	Host Parallel Interface
21	RS2	IB	Host Parallel Interface
22	RS1	IB	Host Parallel Interface
23	RS0	IB	Host Parallel Interface
24	YCLK	I	Modem Interconnect
25	IACLK	MI	Modem Interconnect
26	IA1CLK	MI	Modem Interconnect
27	CTRLSIN_S/NC	MI	Modem Interconnect
28	RESERVED/NC	MI	Modem Interconnect
29	SOUT_S/NC	MI	Modem Interconnect
30	SIN_S/NC	MI	Modem Interconnect
31	FSYNC_S/NC	MI	Modem Interconnect
32	IARESET_S#/NC	MI	Modem Interconnect
33	AGND1	GND	IA Analog Ground
34	LINEIN_S/NC	I	Line Interface
35	MICP_S/NC	I	Microphone Input
36	MICM_S/NC	I	Microphone Input
37	MICBIAS_S/NC	O	Microphone Bias Output
38	NC	—	No Connection
39	NC	—	No Connection
40	VREF_S/NC	MI	Modem Interconnect
41	VC_S/NC	MI	Modem Interconnect
42	VAA_S/NC	PWR	5V IA Analog power
43	LINEOUT_S/NC	O	Line Interface
44	NC	—	No Connection
45	AGND2	GND	IA Analog Ground
46	SPKRP_S/NC	O	Speaker Interface Output
47	SPKRM_S/NC	O	Speaker Interface Output
48	AVDD_S/NC	PWR	5V IA Digital power
49	RESERVED/NC	MI	Modem Interconnect
50	ICLK_S/NC	MI	Modem Interconnect
51	MCLK_P	MI	Modem Interconnect
52	CTRLSIN_P	MI	Modem Interconnect
53	RESERVED	MI	Modem Interconnect
54	SOUT_P	MI	Modem Interconnect
55	SIN_P	MI	Modem Interconnect
56	FSYNC_P	MI	Modem Interconnect
57	IARESET_P#	MI	Modem Interconnect
58	AGND3	GND	IA Analog Ground
59	NC	—	No Connection
60	LINEIN_P	I	Line Interface
61	MICP_P	I	Microphone Input
62	MICM_P	I	Microphone Input
63	MICBIAS_P	O	Microphone Bias Output
64	NC	—	No Connection
65	NC	NC	No Connection
66	VREF_P	MI	Modem Interconnect
67	VC_P	MI	Modem Interconnect
68	VAA_P	PWR	5V Analog Supply for IA
69	LINEOUT_P	O	Line Interface
70	AGND4	GND	IA Analog Ground
71	SPKRP_P	O	Speaker Interface Output

FM209V (IC5) Hardware Interface Signals**Pin Signals – 128-Pin TQFP**

Pin No.	Signal Name	I/O Type	Pin Description
72	SPKRM_P	O	Speaker Interface Output
73	AVDD_P	PWR	5V Digital power for IA
74	NC	—	No Connection
75	ICLK_P	MI	Modem Interconnect
76	MCLK_S/NC	MI	Modem Interconnect
77	VDD2	PWR	3.3V Digital Supply for DSP
78	D7	IB/OC	Host Parallel Interface
79	D6	IB/OC	Host Parallel Interface
80	D5	IB/OC	Host Parallel Interface
81	D4	IB/OC	Host Parallel Interface
82	D3	IB/OC	Host Parallel Interface
83	D2	IB/OC	Host Parallel Interface
84	DGND2	GND	DSP Digital Ground
85	VDD3	PWR	3.3V Digital Supply for DSP
86	D1	IB/OC	Host Parallel Interface
87	DGND3	GND	DSP Digital Ground
88	D0	IB/OC	Host Parallel Interface
89	CSBR#	IB	Host Parallel Interface
90	WRITE#	IB	Host Parallel Interface
91	CS#	IB	Host Parallel Interface
92	READ#	IB	Host Parallel Interface
93	GPI2	IA	General purpose input
94	GPI3	IA	General purpose input
95	GPI4	IA	General purpose input
96	GPI5	IA	General purpose input
97	GPI6	IA	General purpose input
98	GPI7	IA	General purpose input
99	GPO7	OC	General purpose output
100	VDD4	PWR	3.3V DSP Digital Power
101	GPO6	OC	General purpose output
102	GPO5	OC	General purpose output
103	RESERVED	MI	Modem Interconnect
104	GPO4	OC	General purpose output
105	GPO3	OC	General purpose output
106	DGND4	GND	DSP Digital Ground
107	CTS#	OB	DTE Serial Interface
108	IRQ1#	OB	Interrupt request
109	GPO2	OC	General purpose output
110	GPO1	OC	General purpose output
111	GPO0	OC	GPO0 (IA reset)
112	VDD5	PWR	3.3V DSP Digital Power
113	VGG	PWR	5V DSP Digital
114	DGND5	GND	DSP Digital Ground
115	RESET#	IB	External reset
116	XTALI	I	Crystal in
117	XTALO	O	Crystal out
118	RESERVED	MI	Modem Interconnect
119	XCLK	OB	X clock output
120	GPI1	IA	General purpose input
121	IRQ2#	OA	Interrupt request
122	SR3IN	MI	Modem Interconnect
123	RESERVED	MI	Modem Interconnect
124	RESERVED	MI	Modem Interconnect
125	DGND6	GND	DSP Digital Ground
126	DVAA	PWR	3.3V DSP analog power
127	AGND5	GND	DSP Analog Ground
128	RESERVED	MI	Modem Interconnect

Notes:

I/O types: MI = Modem interconnect.

IA, IB, = digital input

OA, OB, OC = digital output

I = analog input

O = analog output

_P Signals: Primary IA

_S Signals: Secondary IA

Reserved = No external connection allowed.

[3] Circuit description of TEL/LIU PWB

(1) TEL/LIU block operational description

1) Block diagram

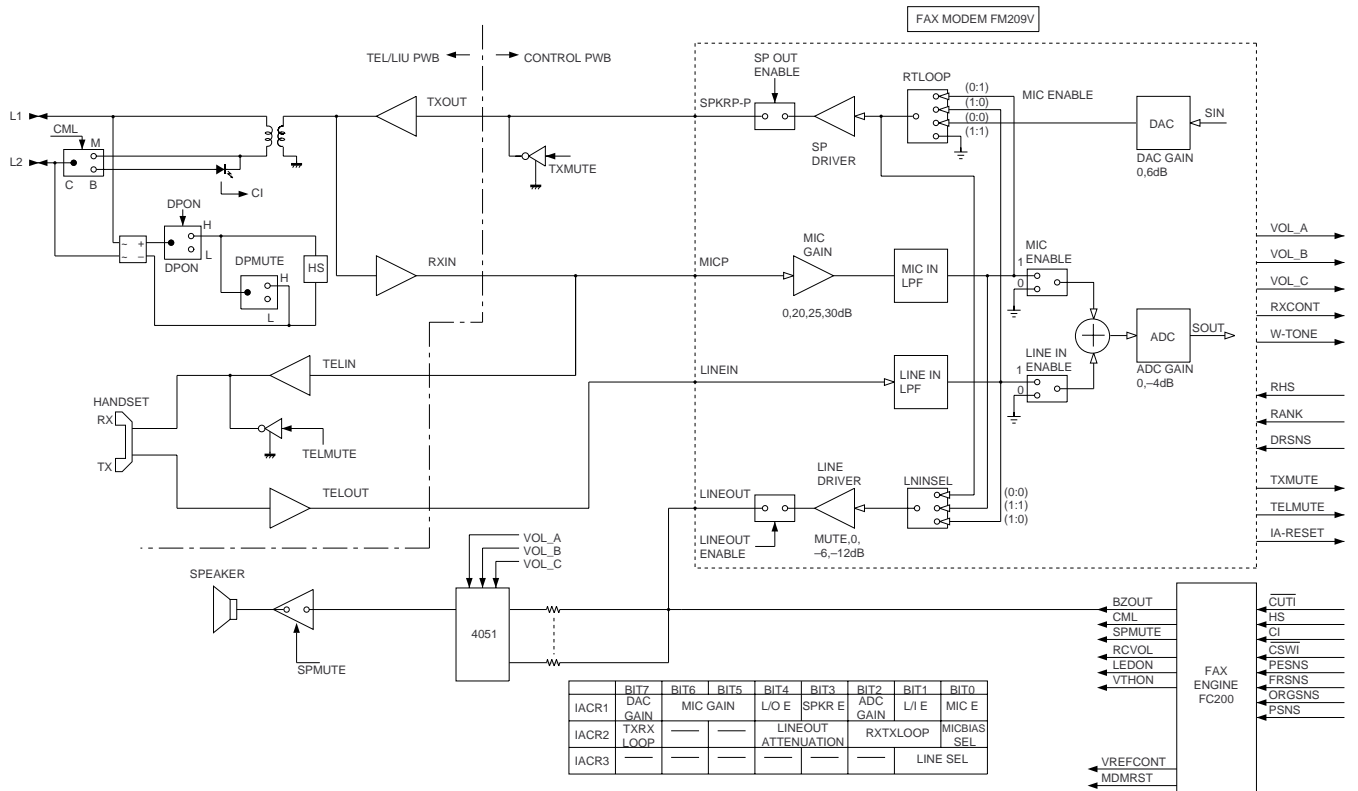


Fig. 6

2) Circuit description

The TEL/LIU PWB is composed of the following 6 blocks.

1. Speech circuit section
2. Dial transmission section
3. Speaker amplifier section
4. Ringer circuit section
5. Externally connected TEL OFF HOOK detection circuit
6. CI detection circuit

3) Block description

1. Speech circuit section

- The receiver volume is an electronic volume type, this model is switched in 2 steps.

2. Dial transmission section

- D.P. transmission: The CML relay and PC1 are turned on and off for control in the DP calling system. (Refer to the attached sheet.)
- DTMF transmission: It is formed in the modem, and is output.

3. Speaker amplifier section

- Ringer volume : It is controlled by the combination of the attenuator value of the LINE DRIVER in the modem and the ringer sending level sent from the modem.
- Speaker volume: It is controlled by the attenuator value of the LINE DRIVER in the modem.

4. Ringer circuit section

- The ringer sound is formed in the tone of modem when CI signal is detected. The amplifier circuit drives the speaker of the main body.

5. Externally connected TEL OFF HOOK detection circuit section

- The circuit current detection is turned on together with OFF HOOK of main body or OFF HOOK of externally connected TEL. ON of CML OFF ($\overline{HS}=L$) is judged as OFF HOOK of externally connected TEL.

6. CI detection circuit

- CI is detected by the photocoupler which is integrated in series in the primary side TEL circuit well proven in the existing unit.

4) Signal selection

The following signals are used to control the transmission line of TEL/FAX signal. For details, refer to the signal selector matrix table.

[Control signals from output port]

Signal Name	Description
CML (The circuit is located in the TEL/LIU PWB.)	<u>Line connecting relay</u> H: Line make L: Line break
SP MUTE (The circuit is located in the TEL/LIU PWB.)	<u>Speaker tone mute control signal</u> H: Muting (Power down mode) L: Muting cancel (Normal operation)
TEL MUTE	<u>Handset reception mute control signal</u> H: Muting L: Muting cancel
DPON (The circuit is located in the TEL/LIU PWB.)	<u>Connecting DC circuit and DP generating</u> H: Line connect / Make L: Line disconnect / Break
DPMUTE (The circuit is located in the TEL/LIU PWB.)	<u>Adjust the resistance during make ratio</u> H: Muting L: Muting cancel
TXMUTE (The circuit is located in the control PWB.)	<u>Tx route mute circuit</u> H: Muting L: Muting cancel

VOLUME SETTING

OUTPUT	VALUE	VOL A (GP02)	VOL B (GP03)	VOL C (GP04)	ON-HOOK Receiving	ICM/OGM MONITOR	ICM/OGM PLAY	RINGER	BUZZER	DTMF/DP
X 0	1K	0	0	0	—	—	HIGH	HIGH	—	—
X 1	10K	1	0	0	HIGH	HIGH	MIDDLE1	—	—	—
X 2	39K	0	1	0	MID 1	MID 1	MIDDLE2	—	—	—
X 3	100K	1	1	0	MID 2	MID 2	MIDDLE3	—	—	—
X 4	200K	0	0	1	MID 3	MID 3	LOW	MIDDLE	—	—
X 5	300K	1	0	1	—	—	—	—	—	FIXED
X 6	470K	0	1	1	LOW	LOW	—	—	FIXED	—
X 7	750K	1	1	1	—	—	—	LOW	—	—

[Signals for status recognition according to input signals]

Signal Name	Function
RHS	H: The handset is in the on-hook state. L: The handset is in the off-hook state.
CI	Incoming call (CI) detection signal

[Other signals]

Signal Name	Function
TEL IN	Receiving signal from line or modem
TEL OUT	Transfer signal to line
SPOUT	Speaker output signal
TXOUT	Transmission (DTMF) analog signal output from modem
RXIN	Reception (DTMF, others) analog signal input into modem

NO	Signal Name (CNLIUA)	NO	Signal Name (CNLIUA)
1	TELOUT	7	RXIN
2	TELIN	8	TXOUT
3	TELMUTE	9	CML
4	CI	10	+5V
5	HS	11	DG
6	RHS	12	+24V

NO	Signal Name (CNLIUB)	NO	Signal Name (CNLIUB)
1	N. C.	3	DPON
2	N. C.	4	DPMUTE

(Example: TEL speaking)

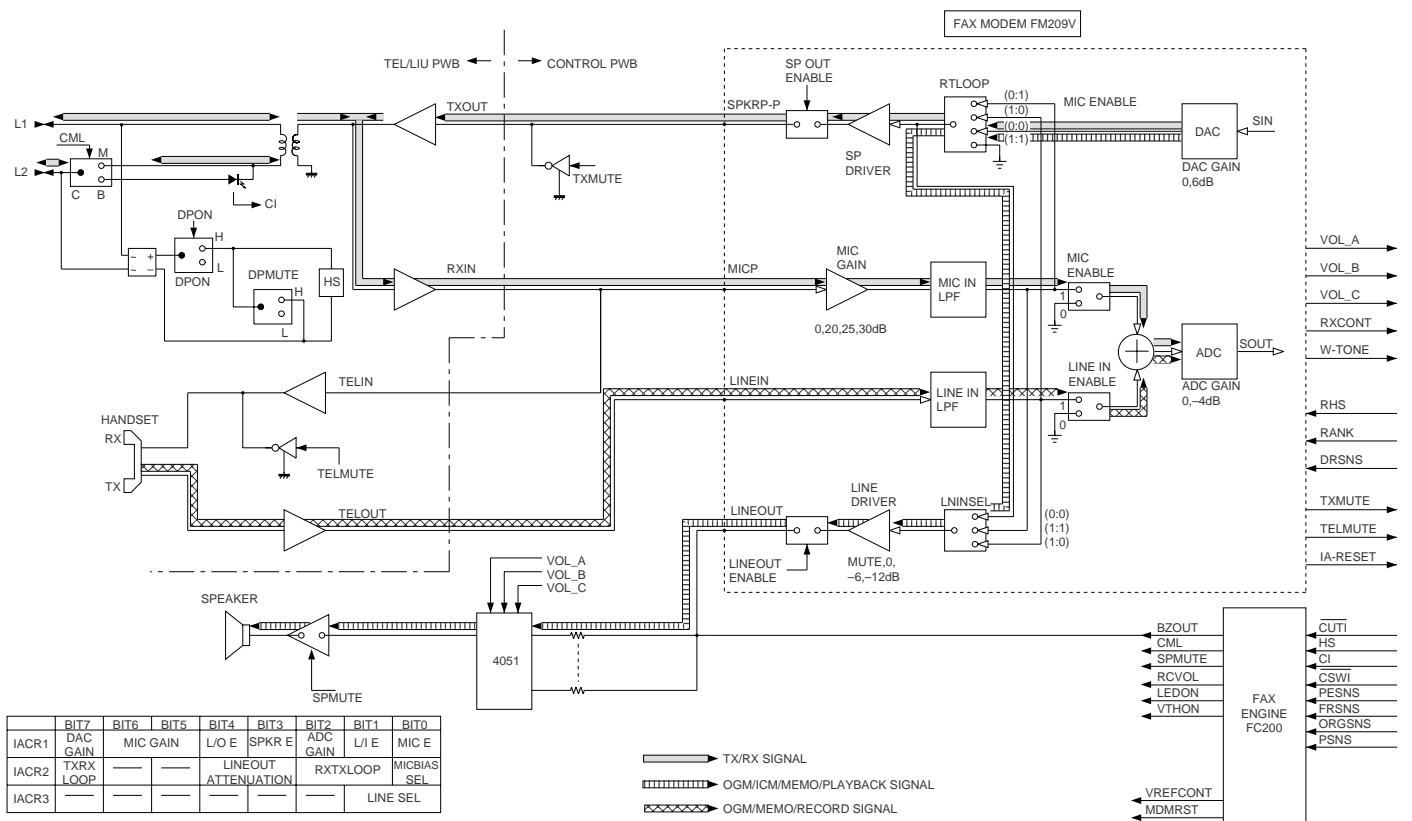


Fig. 7

[4] Circuit description of power supply PWB

1. Block diagram

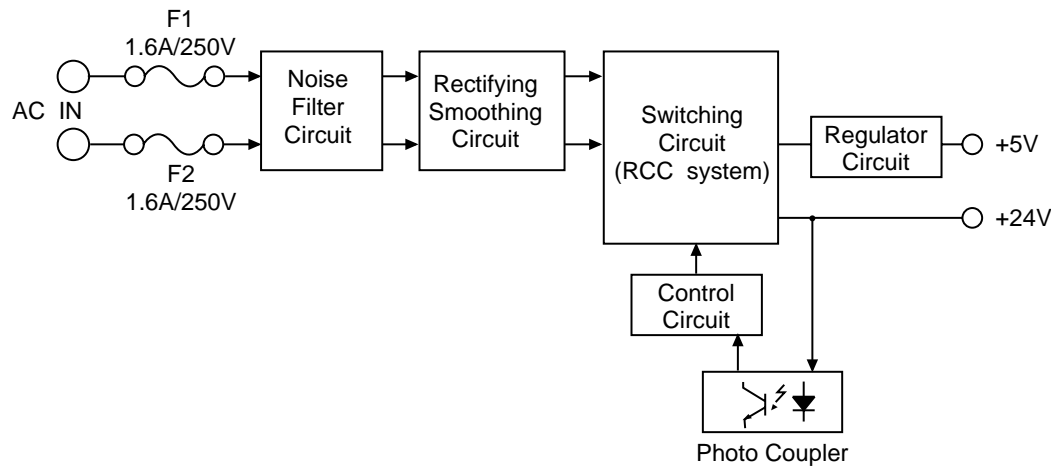


Fig. 8

2-1. Noise filter circuit

The input noise filter section is composed of L1, C1, C15 and C21 which reduces normal mode noise from the AC line and common mode noise to the AC line.

2-2. Rectifying/smoothing circuit

The AC input voltage is rectified by diode D1, 2, 3, 4 and smoothed by capacitor C2 to supply DC voltage to the switching circuit section.
Power thermistor TH1 suppresses inrush current at power switch-on.

2-3. Switching circuit

This circuit includes MOS FET Q1 and the gate drive circuit, and components around Q1.
In this circuit, the DC voltage supplied from the rectifying/smoothing section is converted into high frequency pulses by ON/OFF repetition of Q1.

2-4. Control circuit

This circuit controls output voltage of 24V by adjusting ON period of Q1, looking at signal from photo-coupler PC1.
In this operation IC1 takes charge of important part.
The over current protection is performed by bringing Q1 to OFF state through detection of voltage of T1 subwinding.
The over voltage protection is performed by operating the over current protection circuit through detection of zener diode ZD4 and short-circuiting of load.

2-5. +5V circuit

DC voltage supplied by rectifying the output of transformer T1 with diode D8 is stabilized by 3-terminal regulator IC1.

[5] Circuit description of CIS unit

1. CIS (Contact Image Sensor)

Cis is an image sensor which puts the original paper in close contact with the full-size sensor for scanning, being a monochromatic type with the pixel number of 1,728 dots and the main scanning density of 8 dots/mm.
It is composed of sensor, rod lens, LED light source, light-conductive plate, control circuit and so on, and the reading line and focus are previously adjusted as the unit.
Due to the full-size sensor, the focus distance is so short that the set is changed from the light weight type to the compact type.

2. Waveforms

The following clock is supplied from FC200 of the control board, and VO is output.

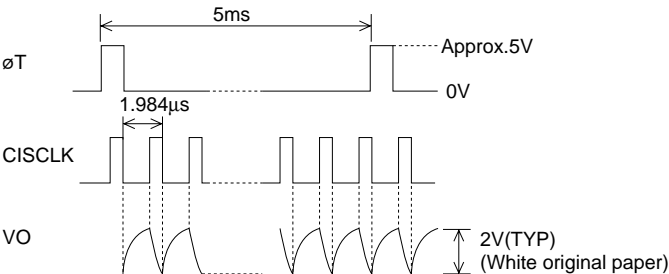
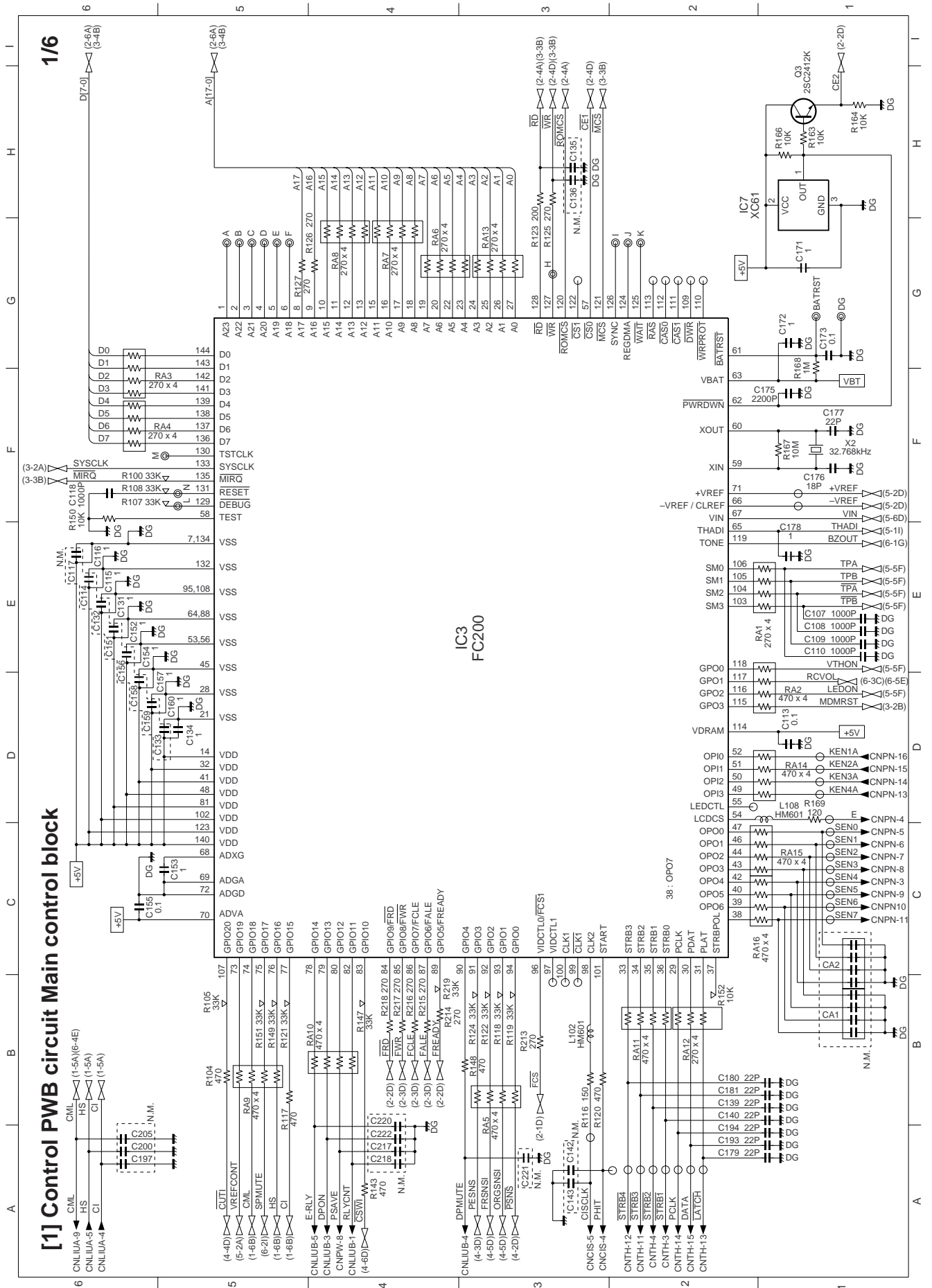
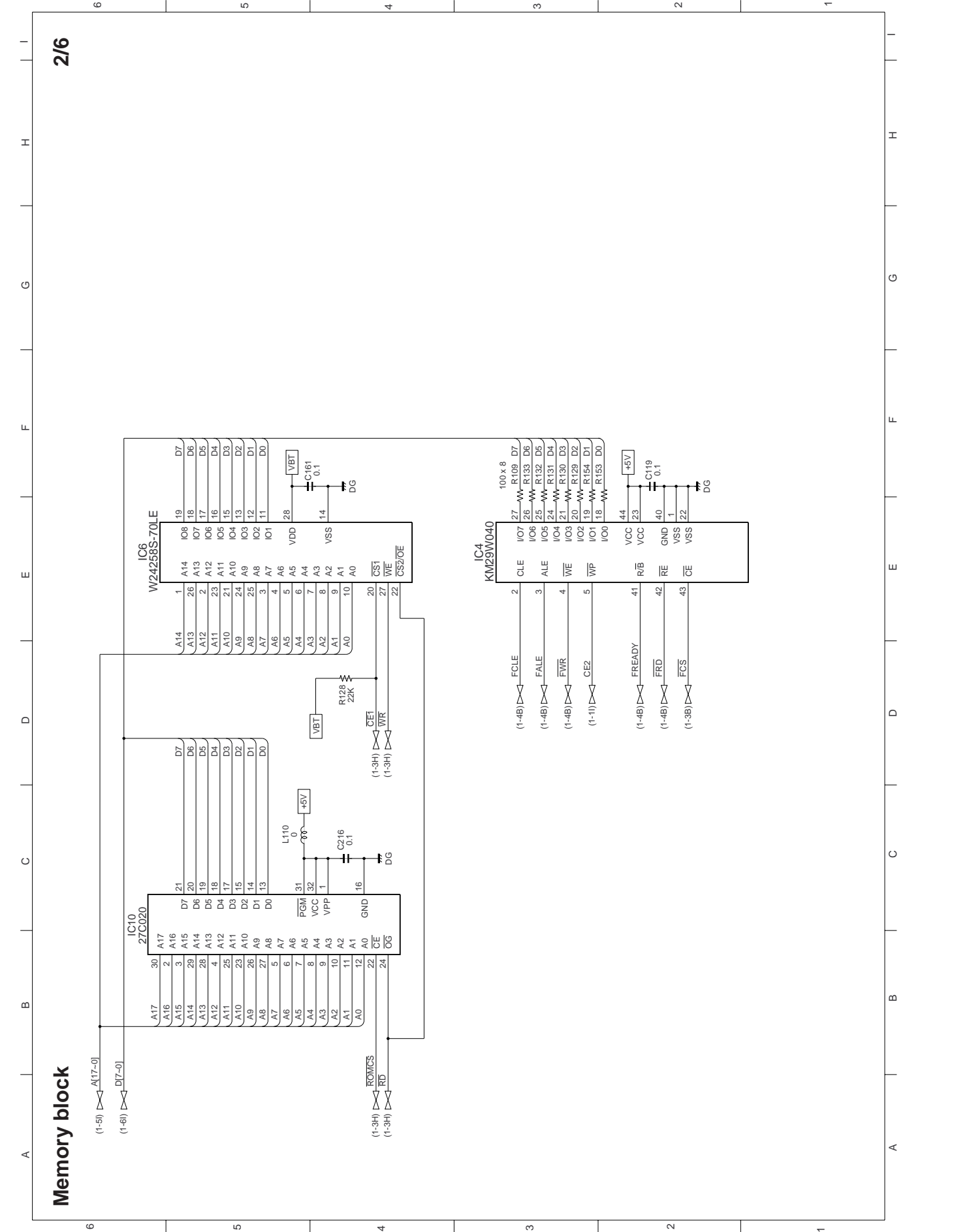
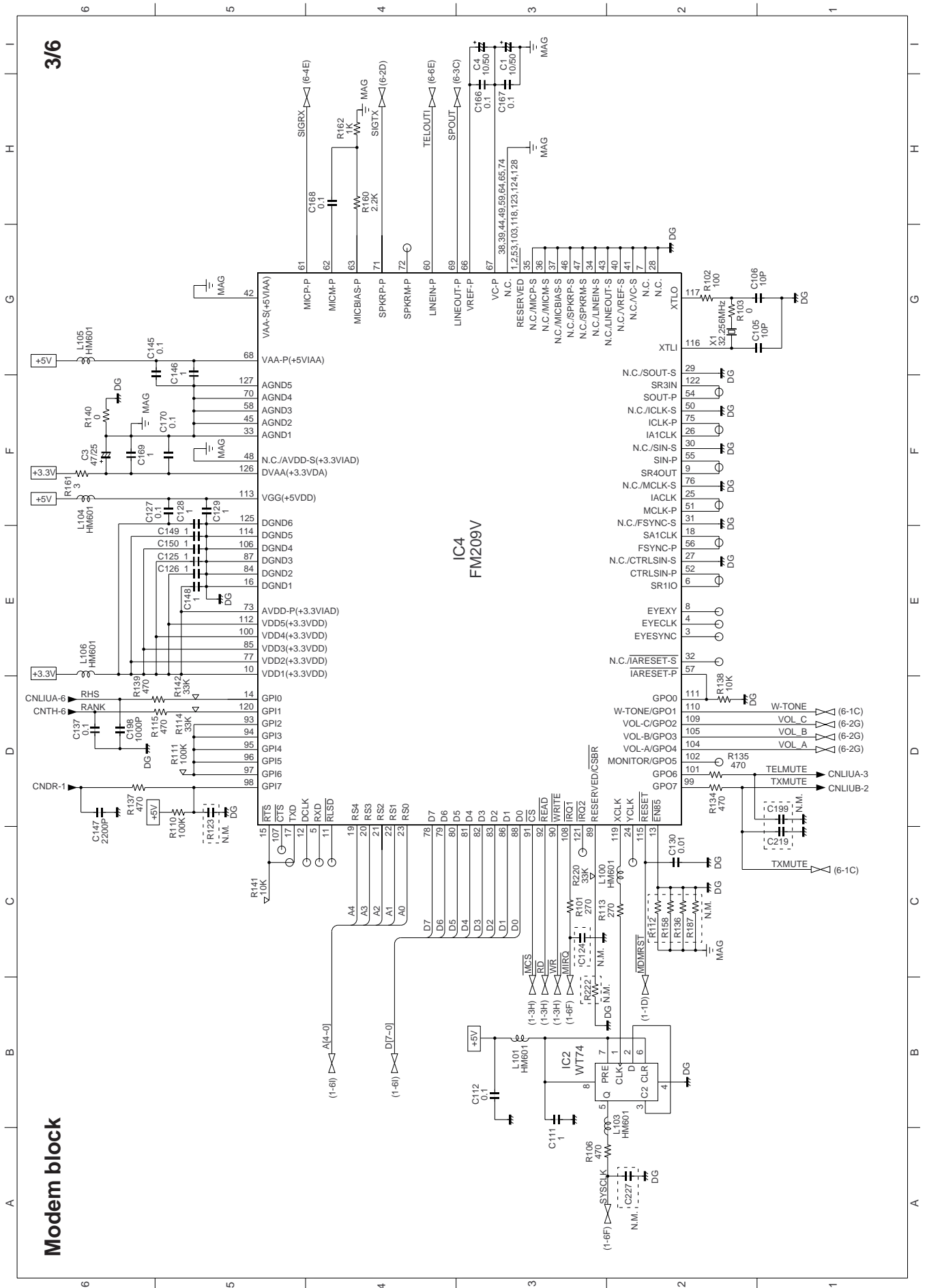


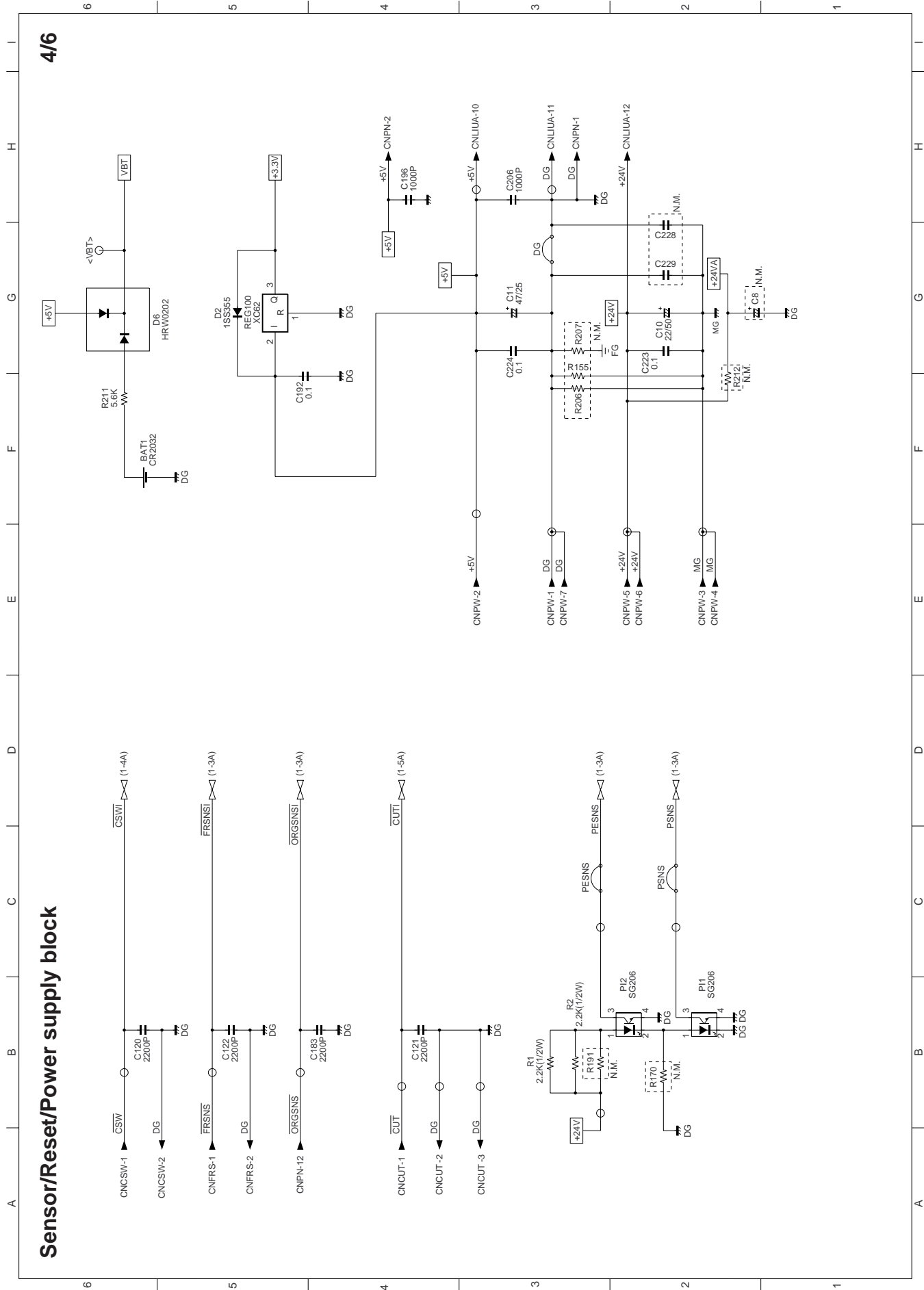
Fig. 9

CHAPTER 6. CIRCUIT SCHEMATICS AND PARTS LAYOUT



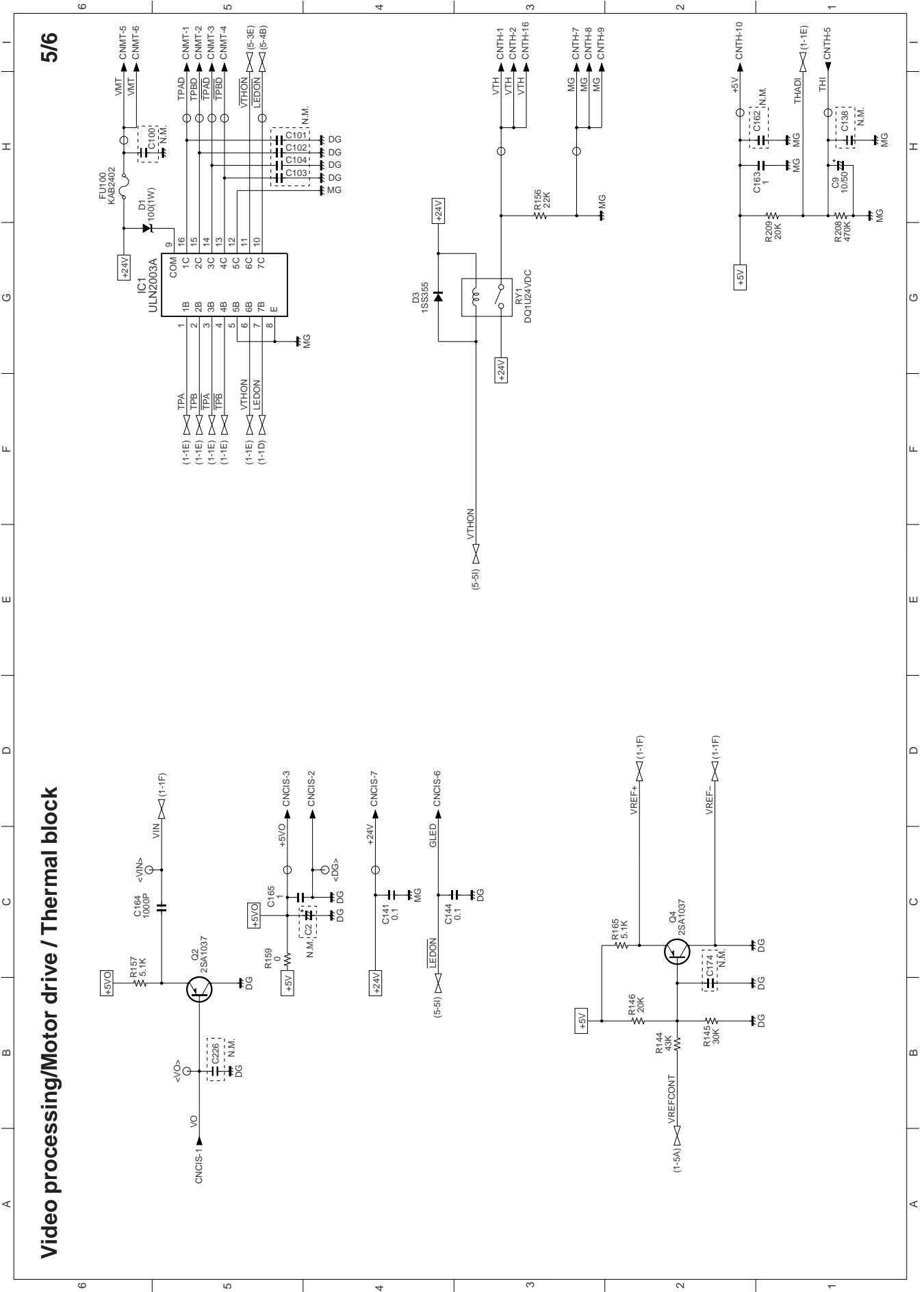


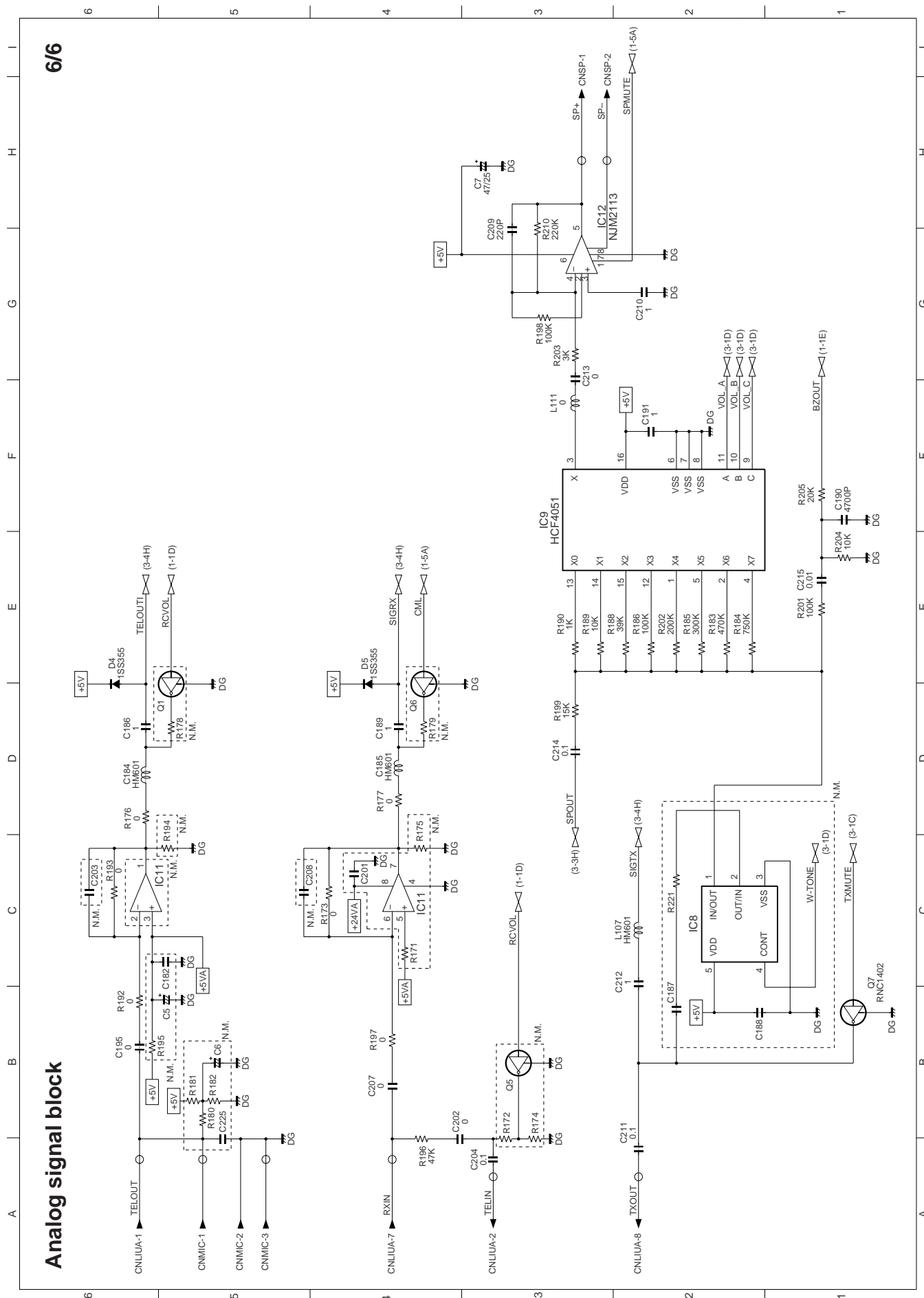




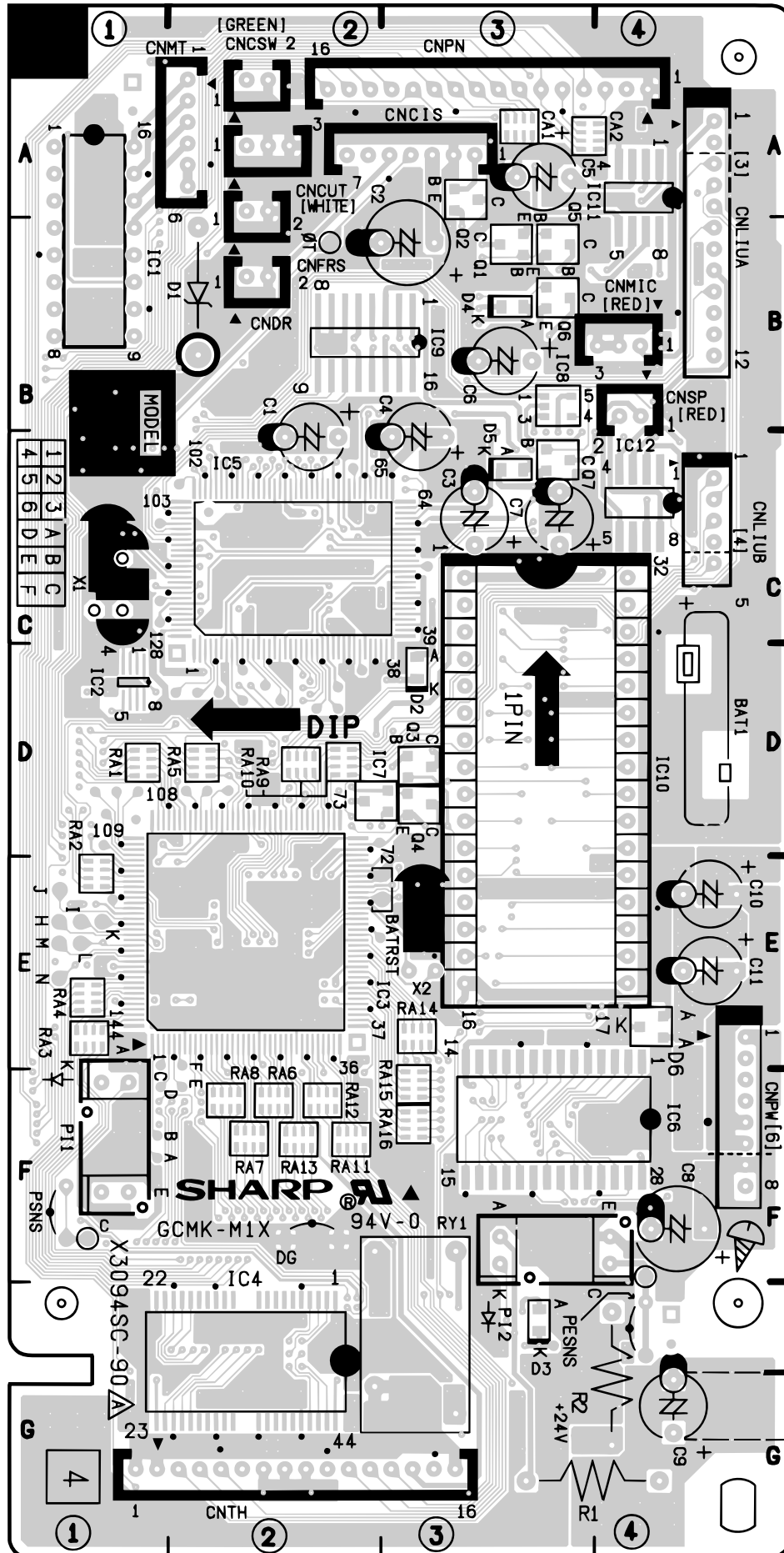
Video processing/Motor drive / Thermal block

5/6





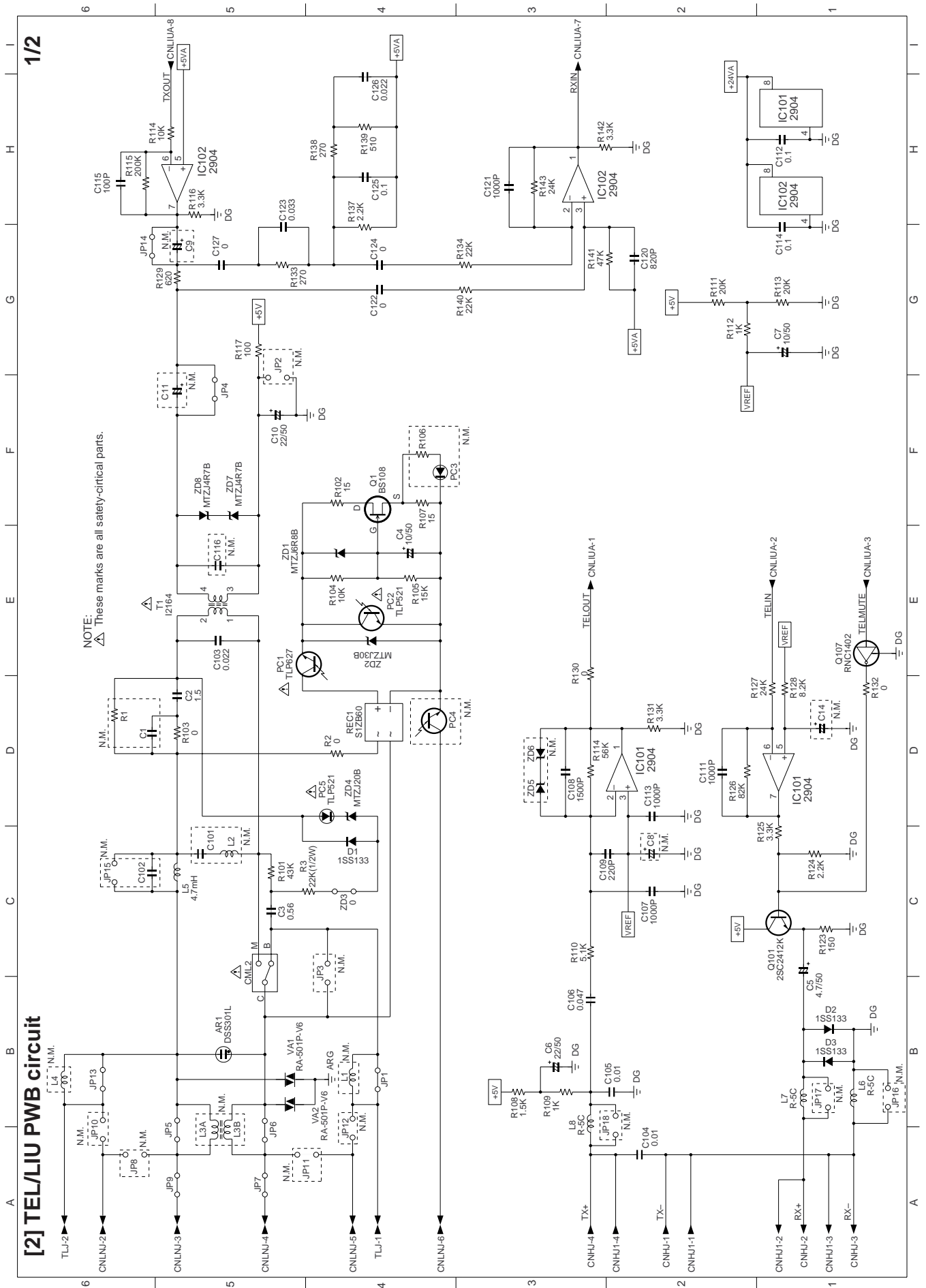
Control PWB parts layout (Top side)



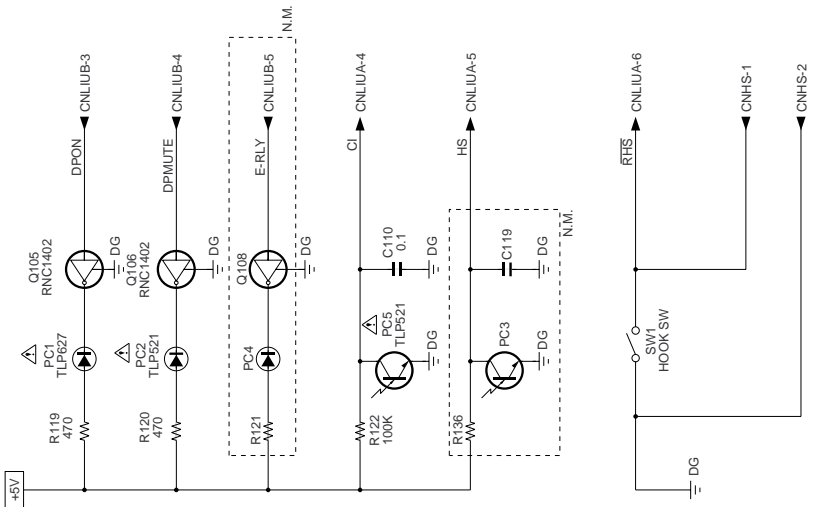


[2] TEL/LIU PWB circuit

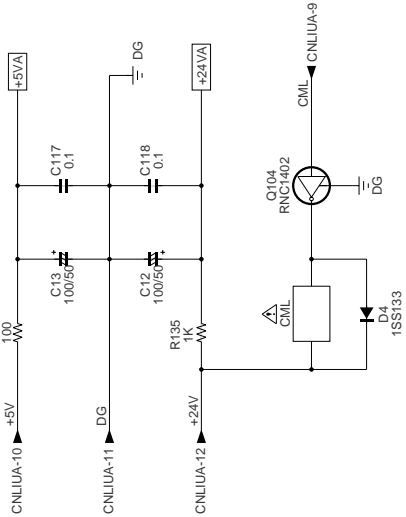
1/2



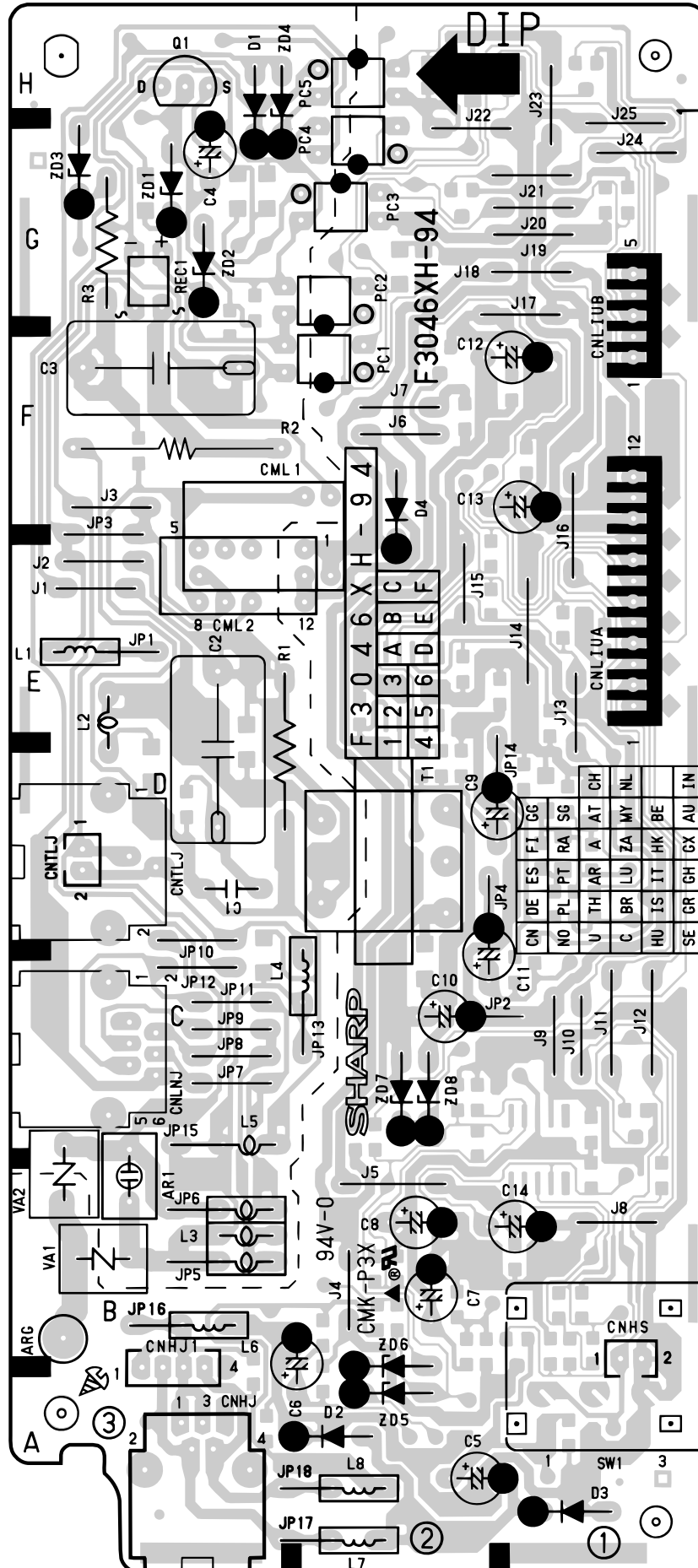
TEL/LIU PWB circuit



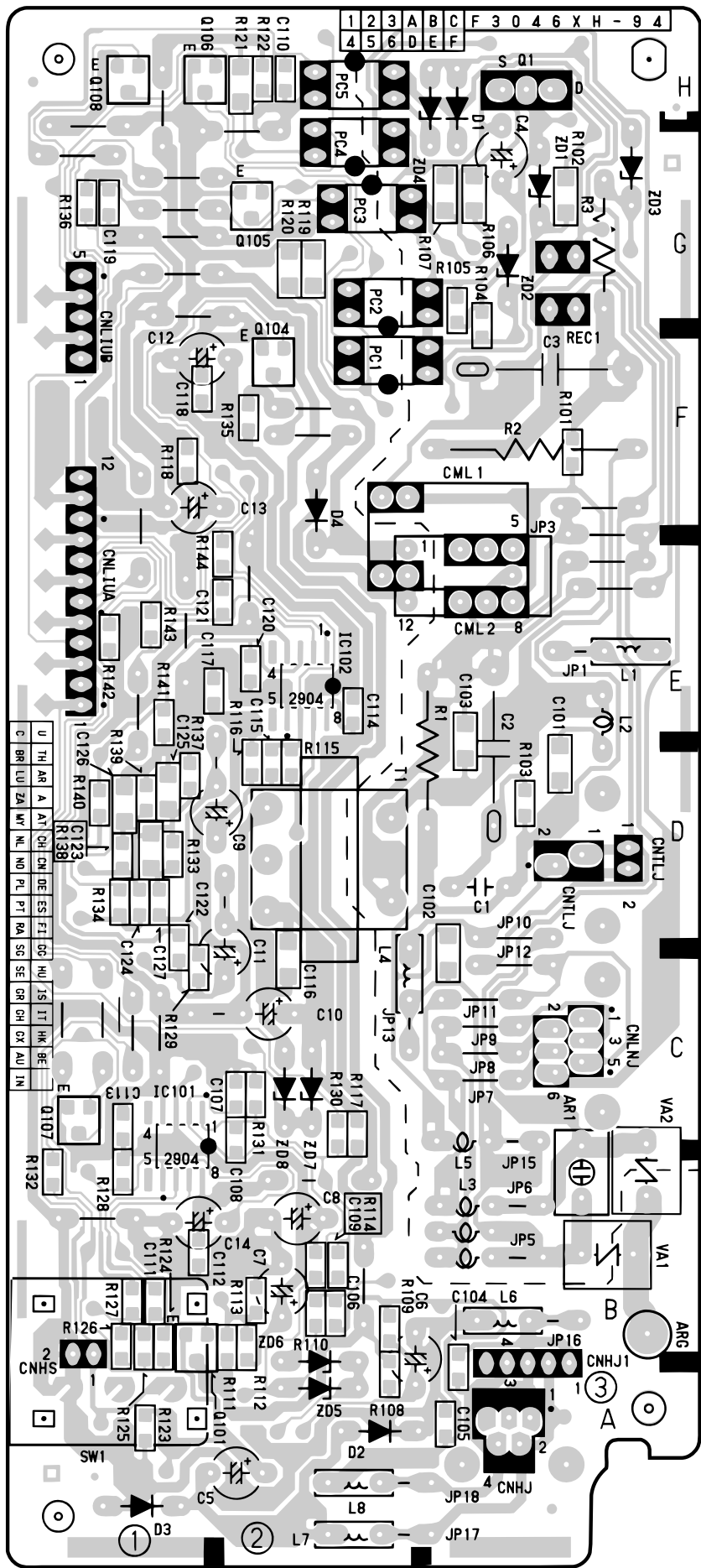
NOTE:
△ These marks are all safety-critical parts.



TEL/LIU PWB parts layout (Top side)

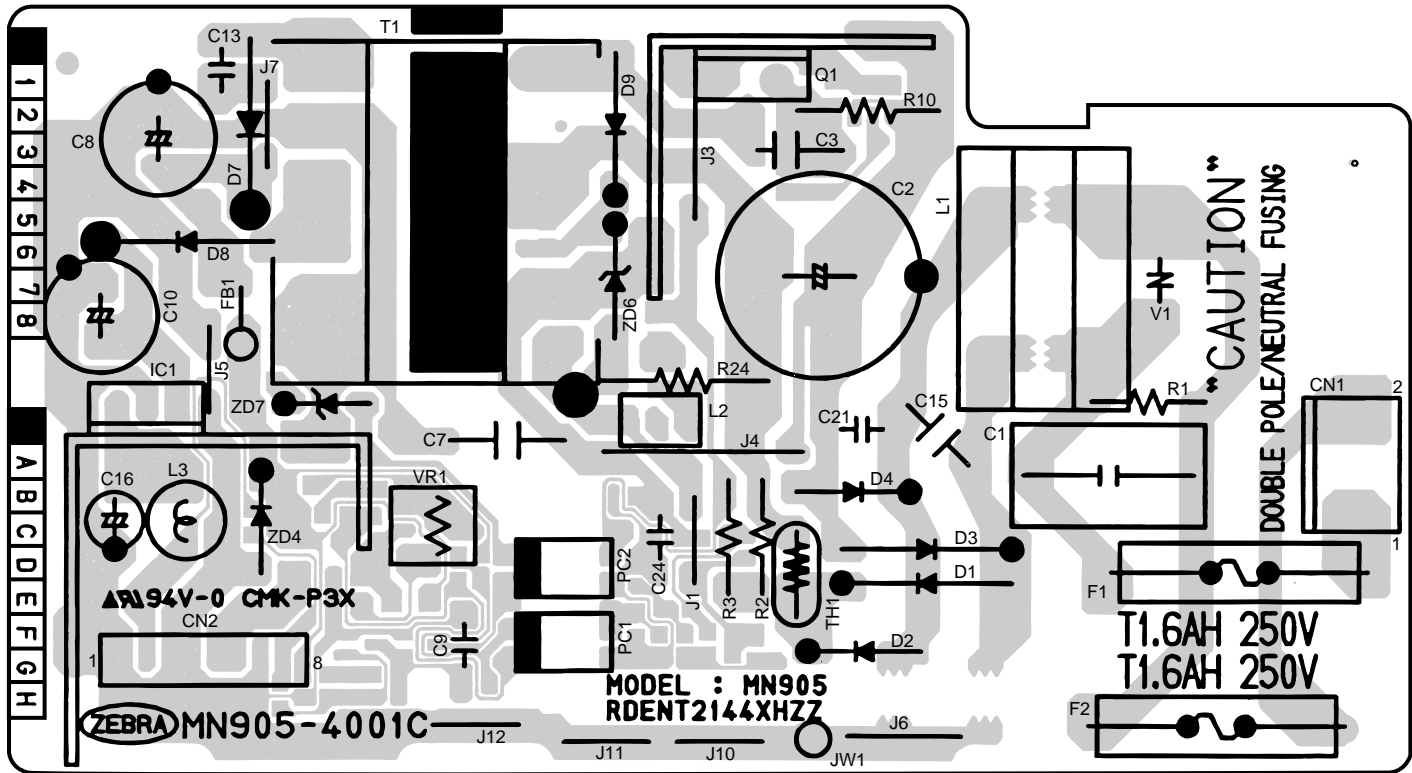


TEL/LIU PWB parts layout (Bottom side)

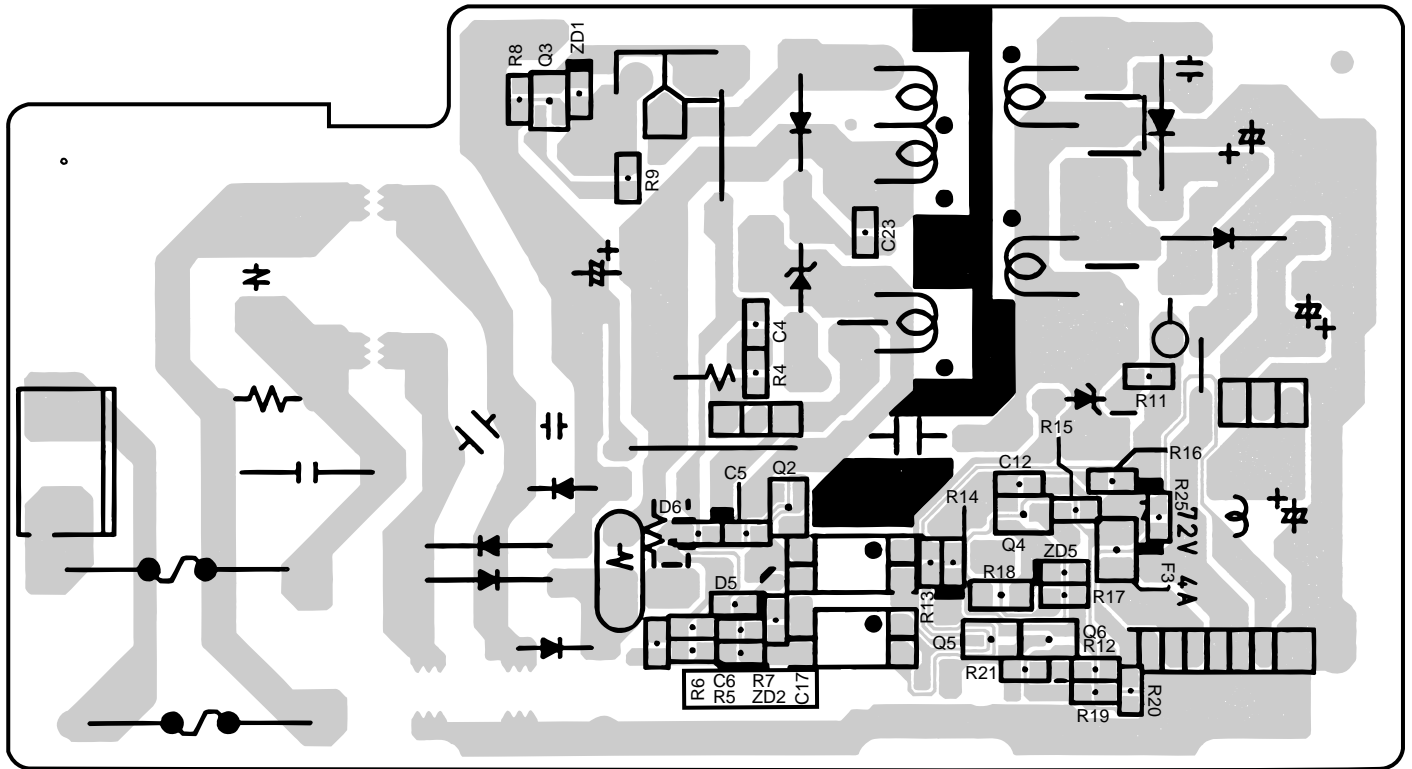




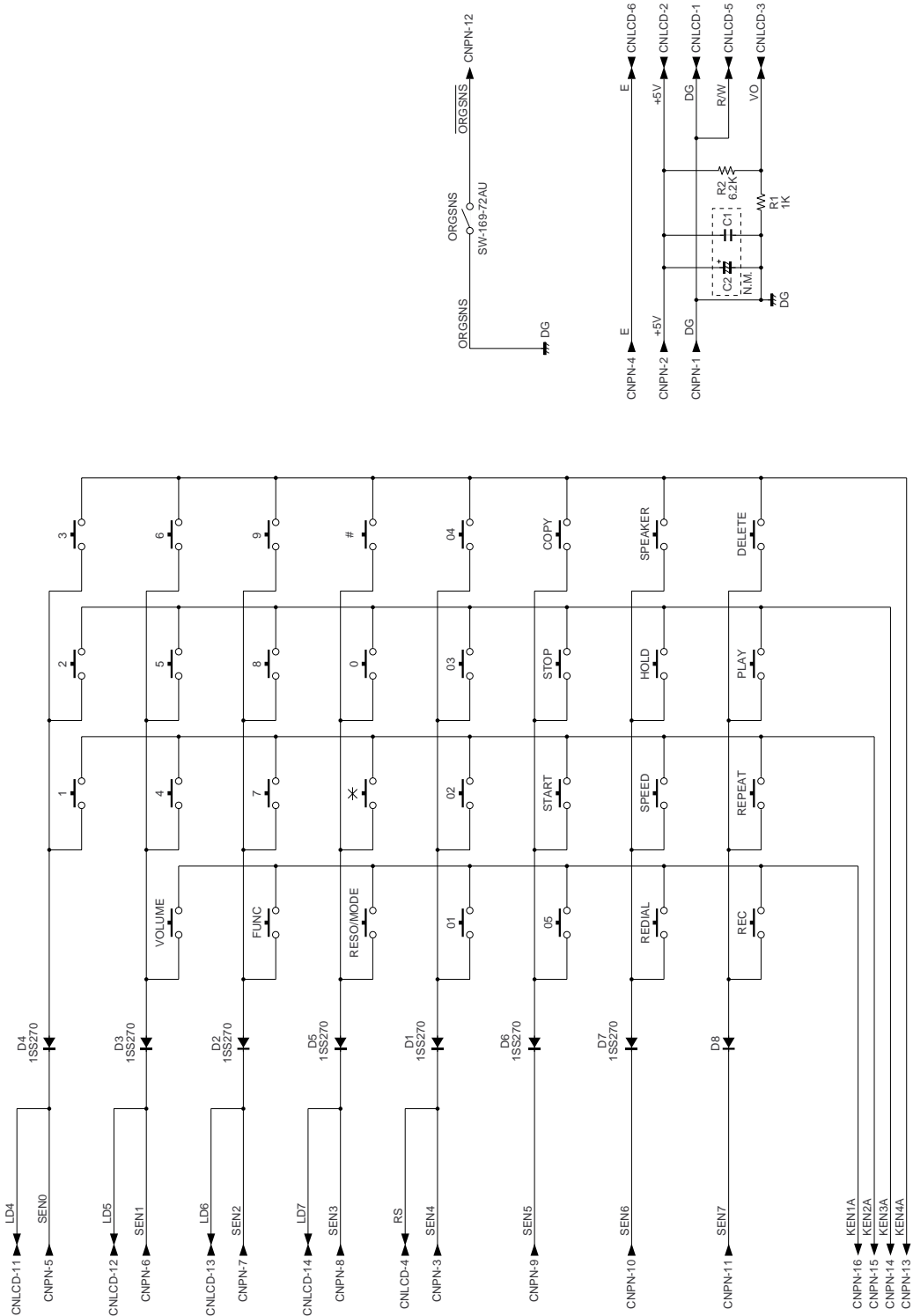
Power supply PWB parts layout (Top side)



Power supply PWB parts layout (Bottom side)



[4] Operation panel PWB circuit



NOTE: Since the parts of PWB cannot be supplied, change it as a unit.

MEMO

SHARP PARTS GUIDE

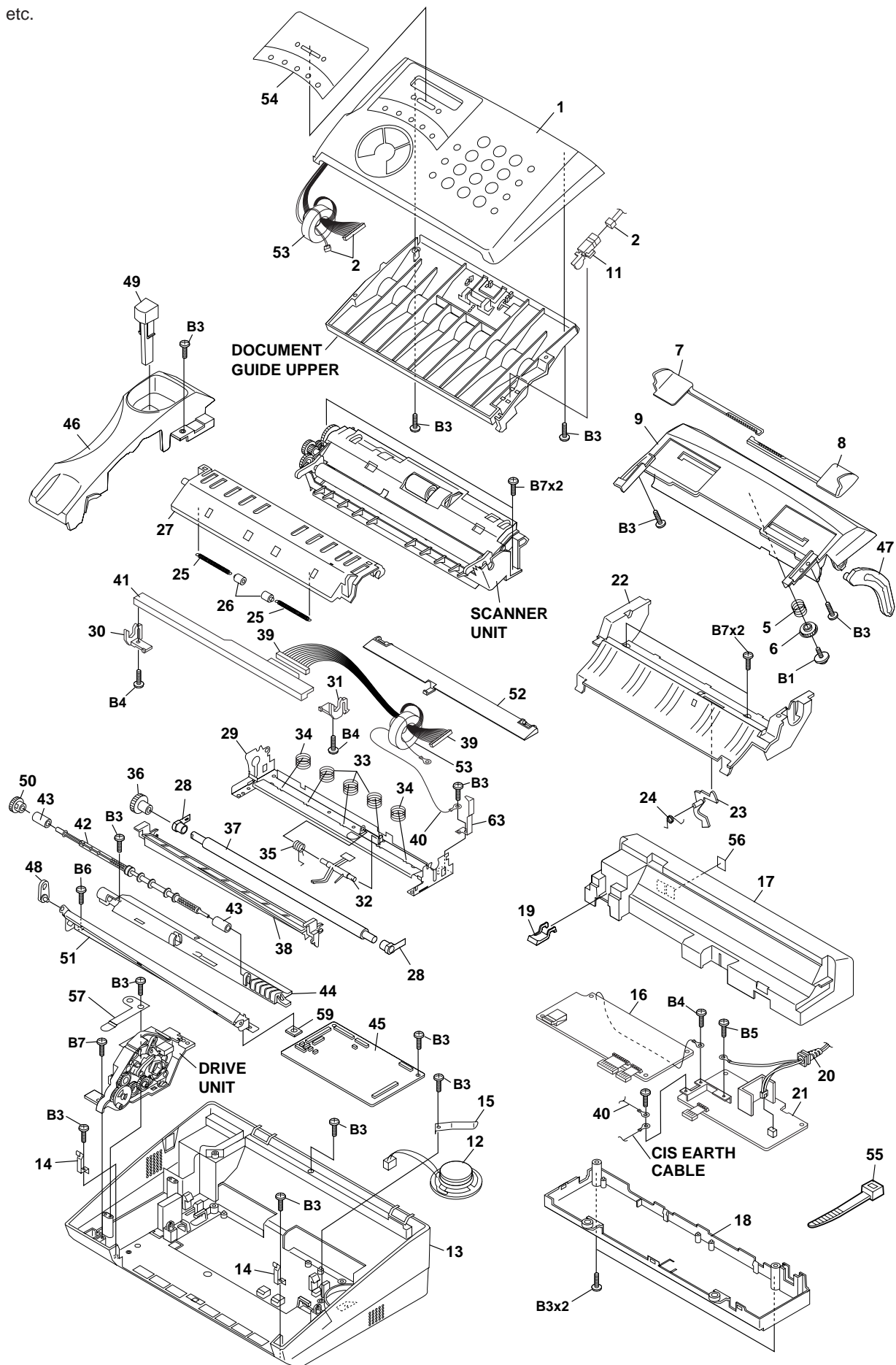
MODEL FO-90A

CONTENTS

- | | |
|------------------------|----------------------------------|
| 1 Cabinet, etc. | 6 Packing material & Accessories |
| 2 Scanner unit | 7 Control PWB unit |
| 3 Upper cabinet | 8 TEL-LIU PWB unit |
| 4 Document guide upper | 9 Power supply PWB unit |
| 5 Drive unit | ■ Index |

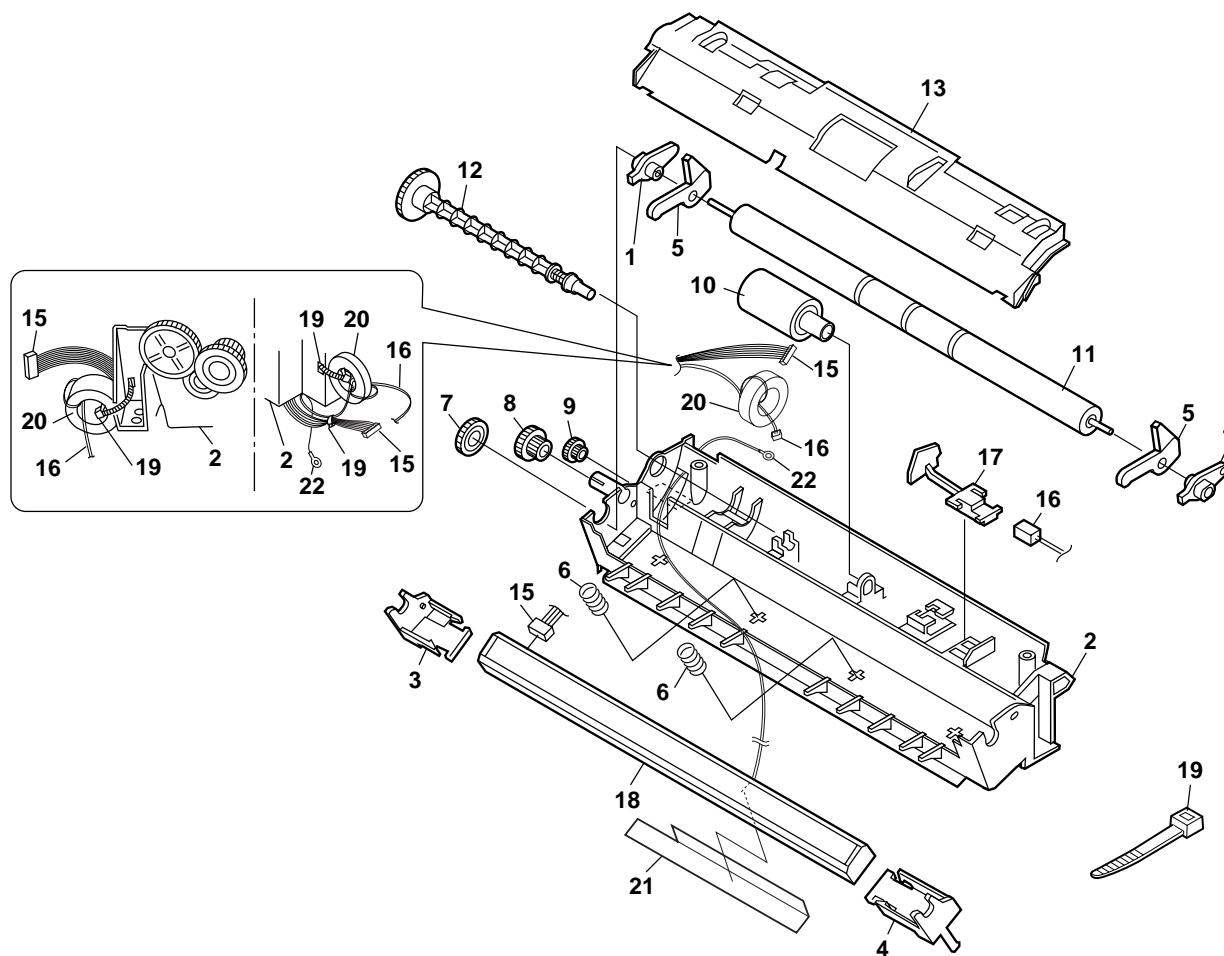
Because parts marked with "△" are indispensable for the machine safety maintenance and operation, it must be replaced with the parts specific to the product specification.

[1] Cabinet, etc.

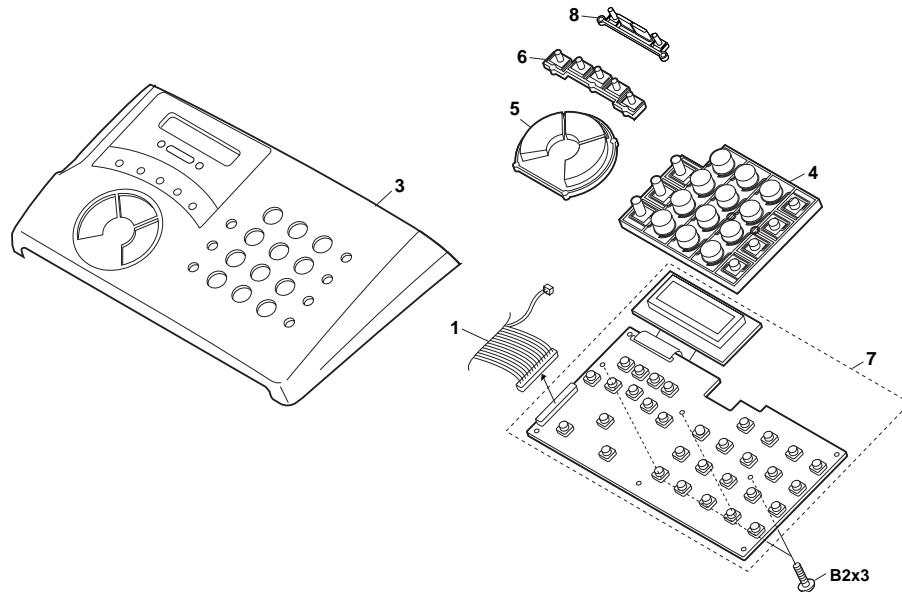


[illegible]

[2] Scanner unit

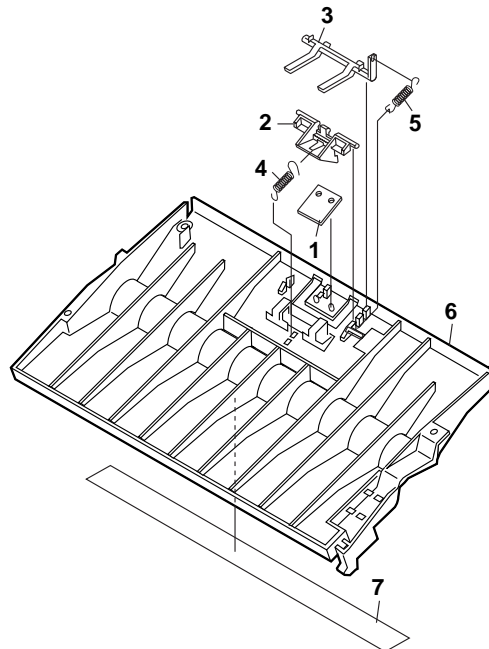
[illegible]

[3] Upper cabinet

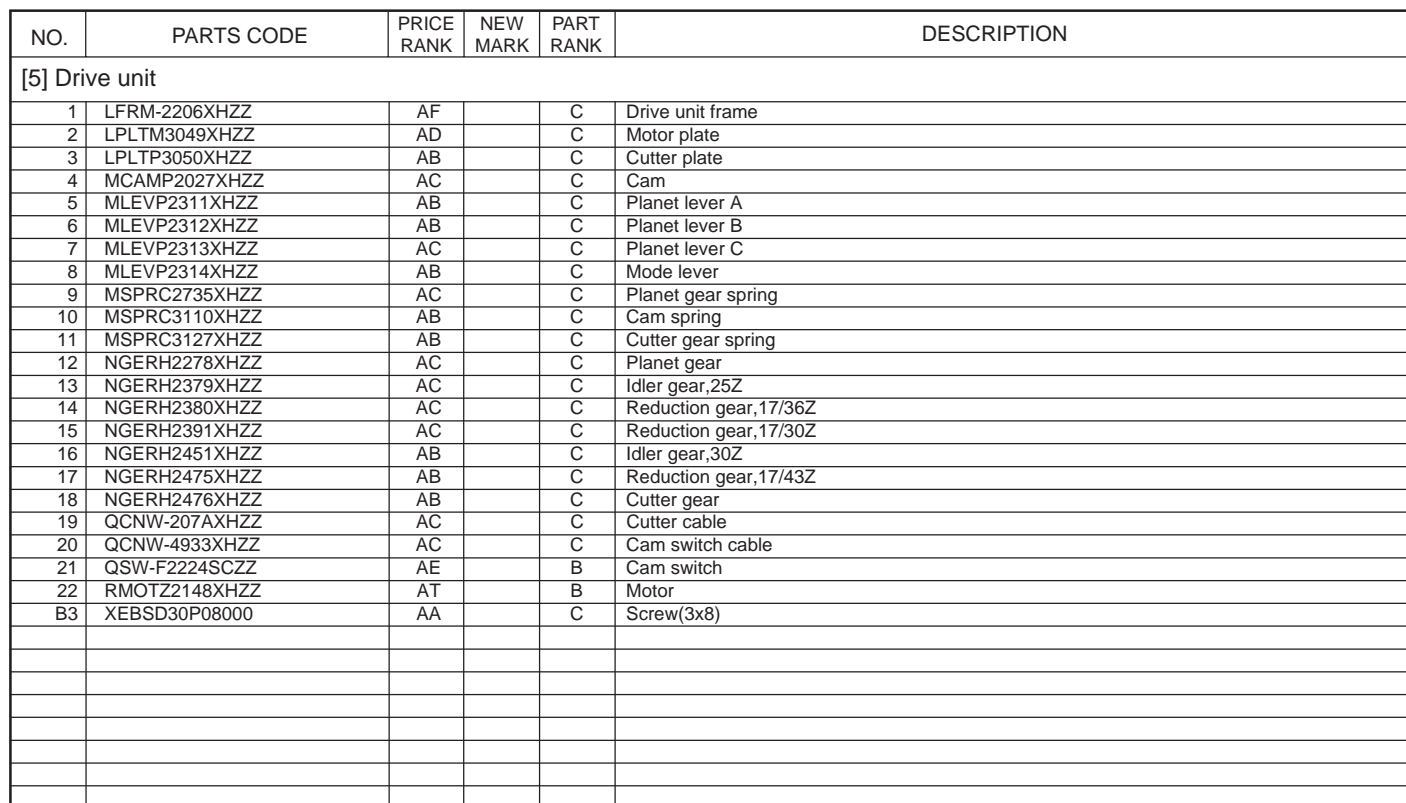


NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
[3] Upper cabinet					
1	CCNW-212AXH01	AK		C	Panel cable ass'y
3	GCABA2342XHSM	AH	N	D	Upper cabinet
4	JBTN-2257XHSA	AD		C	12 key
5	JBTN-2258XHSA	AC		C	Start key
6	JBTN-2261XHSA	AC		C	Direct key
7	DCEKP482BXH03	BB	N	E	Operation panel PWB unit
8	JBTN-2262XHSA	AC	N	C	TAD key
B2	XUBSD20P06000	AA		C	Screw(2x6)
	(Unit)				
901	DCEKP481BXH52	BB	N	E	Operation panel unit

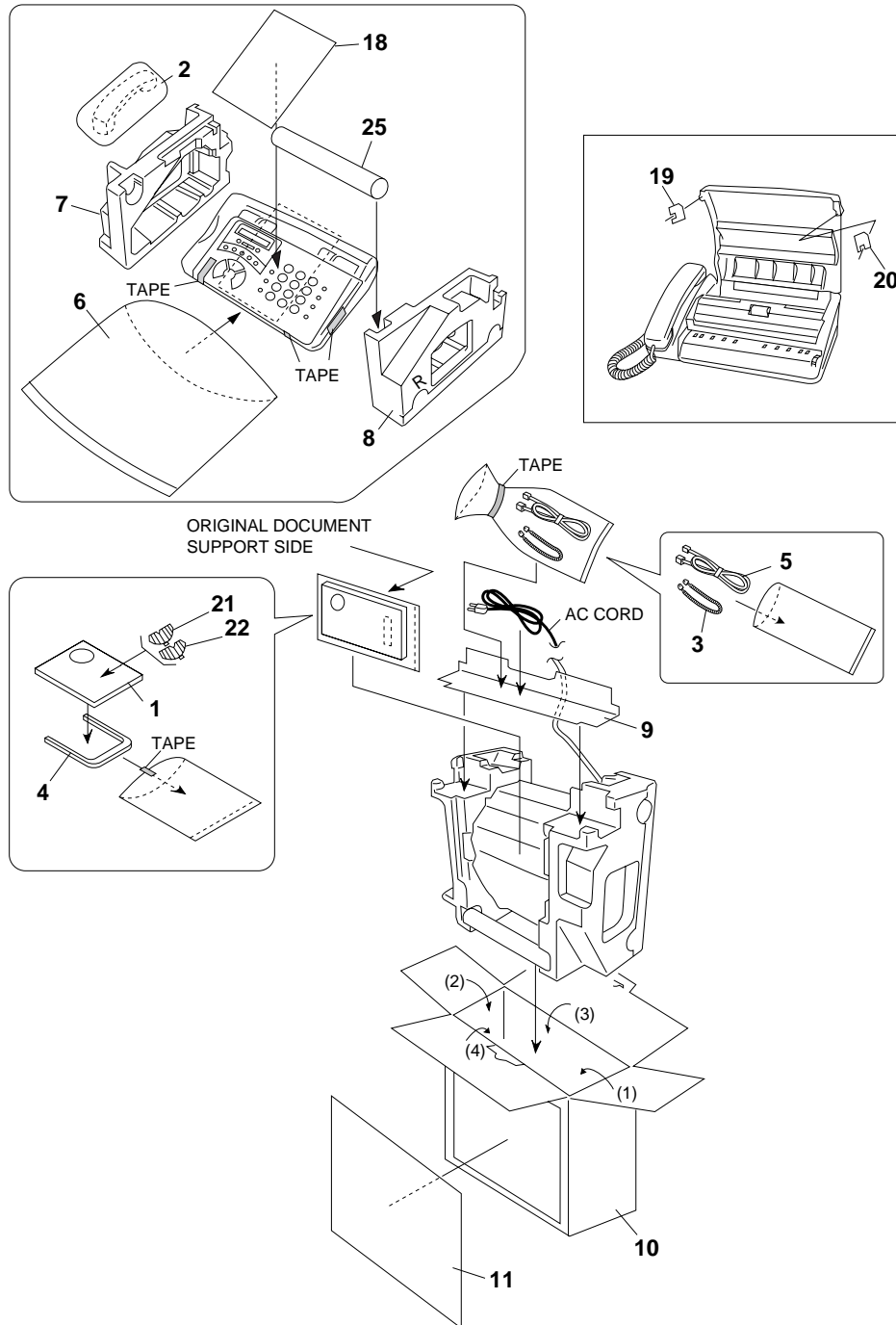
[4] Document guide upper



NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
[4] Document guide upper					
1	LPLTG2911XHZZ	AE		C	Separator rubber
2	LPLTP2908XHZZ	AE		C	Separator plate
3	LPLTP3051XHZZ	AB		C	Feed plate
4	MSPRT3140XHZZ	AA		C	Separate spring
5	MSPRT3139XHZZ	AA		C	Feed spring
6	PGIDM2554XHZZ	AF		C	Document guide upper
7	PSHEZ3510XHZZ	AE		C	Blind sheet



[6] Packing material & Accessories



NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
[6] Packing material & Accessories					
1	TINSS4042XHZZ	AS	N	D	Operation manual
2	DUNTK468BXHBG	AH		E	Handset
3	QCNW-3976XHBG	AK		C	Handset cord
4	PHOP-2105XHZZ	AD		C	Original document support
5	QCNW-3975XHGY	AG		C	Telephone line cord
6	SPAKP296BXHZZ	AE		D	Vinyl cover
7	SPAKA287BXHZZ	AE		D	Packing add.,left
8	SPAKA288BXHZZ	AE		D	Packing add.,right
9	SPAKA289BXHZZ	AC		D	Pad
10	SPAKC225BXHZZ	AP	N	D	Packing case
11	TLABM358AXHZZ	AS	N	D	Box label
18	TCADZ2935XHZZ	AA		D	Caution sheet
19	SPAKA388BXHZZ	AE		D	Protection sheet,left
20	SPAKA389BXHZZ	AE		D	Protection sheet,right
21	PGIDM2579XHZZ	AE		C	Paper roll shim,left
22	PGIDM2578XHZZ	AE		C	Paper roll shim,right
25	TPAPK2238XHZZ	AS	N	S	Fax paper(Initial starter roll 10m)

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
[7] Control PWB unit					
1	UBATL2046SCZZ	AK		B	Battery(CR2032T34) [BAT1]
2	VCEAGA1HW106M	AA		C	Capacitor(50WV 10μF) [C1]
3	VCEAGA1EW476M	AA		C	Capacitor(25WV 47μF) [C3]
4	VCEAGA1HW106M	AA		C	Capacitor(50WV 10μF) [C4]
5	VCEAGA1EW476M	AA		C	Capacitor(25WV 47μF) [C7]
6	VCEAGA1HW106M	AA		C	Capacitor(50WV 10μF) [C9]
7	VCEAGA1HW226M	AB		C	Capacitor(50WV 22μF) [C10]
8	VCEAGA1EW476M	AA		C	Capacitor(25WV 47μF) [C11]
9	VCCCTV1HH100D	AA		C	Capacitor(50WV 10PF) [C105]
10	VCCCTV1HH100D	AA		C	Capacitor(50WV 10PF) [C106]
11	VCKYTV1HB102K	AA		C	Capacitor(50WV 1000PF) [C107]
12	VCKYTV1HB102K	AA		C	Capacitor(50WV 1000PF) [C108]
13	VCKYTV1HB102K	AA		C	Capacitor(50WV 1000PF) [C109]
14	VCKYTV1HB102K	AA		C	Capacitor(50WV 1000PF) [C110]
15	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C111]
16	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C112]
17	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C113]
18	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C115]
19	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C116]
20	VCKYTV1HB102K	AA		C	Capacitor(50WV 1000PF) [C118]
21	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C119]
22	VCKYTV1HB222K	AA		C	Capacitor(50WV 2200PF) [C120]
23	VCKYTV1HB222K	AA		C	Capacitor(50WV 2200PF) [C121]
24	VCKYTV1HB222K	AA		C	Capacitor(50WV 2200PF) [C122]
25	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C125]
26	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C126]
27	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C127]
28	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C128]
29	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C129]
30	VCKYTV1HB103K	AB		C	Capacitor(50WV 0.01μF) [C130]
31	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C131]
32	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C134]
33	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C137]
34	VCCCTV1HH220J	AA		C	Capacitor(50WV 22PF) [C139]
35	VCCCTV1HH220J	AA		C	Capacitor(50WV 22PF) [C140]
36	VCKYTV1HF104Z	AA		C	Capacitor(50WV 0.1μF) [C141]
37	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C144]
38	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C145]
39	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C146]
40	VCKYTV1HB222K	AA		C	Capacitor(50WV 2200PF) [C147]
41	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C148]
42	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C149]
43	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C150]
44	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C152]
45	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C153]
46	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C154]
47	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C155]
48	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C157]
49	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C160]
50	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C161]
51	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C163]
52	VCKYTV1HB102K	AA		C	Capacitor(50WV 1000PF) [C164]
53	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C165]
54	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C166]
55	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C167]
56	VCKYTV1EB104K	AA		C	Capacitor(25WV 0.1μF) [C168]
57	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C169]
58	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C170]
59	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C171]
60	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C172]
61	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C173]
62	VCKYTV1HB222K	AA		C	Capacitor(50WV 2200PF) [C175]
63	VCCCTV1HH180J	AA		C	Capacitor(50WV 18PF) [C176]
64	VCCCTV1HH220J	AA		C	Capacitor(50WV 22PF) [C177]
65	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C178]
66	VCCCTV1HH220J	AA		C	Capacitor(50WV 22PF) [C179]
67	VCCCTV1HH220J	AA		C	Capacitor(50WV 22PF) [C180]
68	VCCCTV1HH220J	AA		C	Capacitor(50WV 22PF) [C181]
69	VCKYTV1HB222K	AA		C	Capacitor(50WV 2200PF) [C183]
70	RCILZ2145XHZZ	AF		C	Coil(HM601) [C184]
71	RCILZ2145XHZZ	AF		C	Coil(HM601) [C185]
72	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C186]
73	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C189]
74	VCKYTV1HB472K	AA		C	Capacitor(50WV 4700PF) [C190]
75	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C191]
76	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C192]
77	VCCCTV1HH220J	AA		C	Capacitor(50WV 22PF) [C193]
78	VCCCTV1HH220J	AA		C	Capacitor(50WV 22PF) [C194]
79	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [C195]
80	VCKYTV1HB102K	AA		C	Capacitor(50WV 1000PF) [C196]

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
[7] Control PWB unit					
81	VCKYTV1HB102K	AA		C	Capacitor(50WV 1000PF) [C197]
82	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [C202]
83	VCKYTV1EB104K	AA		C	Capacitor(25WV 0.1μF) [C204]
84	VCKYTV1HB102K	AA		C	Capacitor(50WV 1000PF) [C206]
85	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [C207]
86	VCKYTV1HB221K	AA		C	Capacitor(50WV 220PF) [C209]
87	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C210]
88	VCKYTV1EB104K	AA		C	Capacitor(25WV 0.1μF) [C211]
89	VCKYTV1CF105Z	AB		C	Capacitor(16WV 1μF) [C212]
90	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [C213]
91	VCKYTV1EB104K	AA		C	Capacitor(25WV 0.1μF) [C214]
92	VCKYTV1HB103K	AB		C	Capacitor(50WV 0.01μF) [C215]
93	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C216]
94	VCKYTV1HF104Z	AA		C	Capacitor(50WV 0.1μF) [C223]
95	VCKYTV1EF104Z	AA		C	Capacitor(25WV 0.1μF) [C224]
96	QCNCM7014SC0G	AB		C	Connector(7pin) [CNCIS]
97	QCNCM2442SC0B	AB		C	Connector(2pin) [CNCISW]
98	QCNCM7014SC0C	AA		C	Connector(3pin) [CNCUT]
99	QCNCM705BAF06	AB		C	Connector(2pin) [CNDR]
100	QCNCM7014SC0B	AD		C	Connector(2pin) [CNFRS]
101	QCNCW2500SC1B	AF		C	Connector(12pin) [CNLIUA]
102	QCNCW2500SC0D	AG		C	Connector(4pin) [CNLIUB]
103	QCNCM7014SC0F	AB		C	Connector(6pin) [CNMT]
104	QCNCM7014SC1F	AD		C	Connector(16pin) [CNPJ]
105	QCNCW2500SC0H	AF		C	Connector(8pin) [CNPW]
106	QCNCM2401SC0B	AA		C	Connector(2pin) [CNPS]
107	QCNCM7014SC1F	AD		C	Connector(16pin) [CNTH]
108	VRS-HT3AA101J	AA		C	Resistor(1W 100Ω ±5%) [D1]
109	VHD1SS355/-1	AB		B	Diode(1SS355) [D2]
110	VHD1SS355/-1	AB		B	Diode(1SS355) [D3]
111	VHD1SS355/-1	AB		B	Diode(1SS355) [D4]
112	VHD1SS355/-1	AB		B	Diode(1SS355) [D5]
113	VHDHRW0202B-1	AD		C	Diode(HRW0202B) [D6]
114	QFS-P2010SCZZ	AD		B	IC protector(KAB2402) [FU100]
115	VHIULN2003AN/	AE		B	IC(ULN2003A) [IC1]
116	VHITC7WT74FU1	AF		B	IC(TC7WT74) [IC2]
117	VHIFC2FM209V1	BK	N	B	IC(FC200)(Within IC3 and IC5 pair) [IC3]
118	VHIKM29W040-1	AV		B	IC(KM29W040T) [IC4]
119	VHIFC2FM209V1	BK	N	B	IC(FM209V)(Within IC3 and IC5 pair) [IC5]
120	VHIW24258S7LE	AQ		B	IC(W24258S-70LE) [IC6]
121	VHIXC61AN45M1	AE		B	IC(XC61AN4502ML) [IC7]
122	VHIHCF4051M1T	AG		B	IC(HCF4051) [IC9]
123	QSOCZ2051SC32	AC		C	IC socket(32pin) [IC10]
124	VHI27020FNY0A	BN	N	B	IC,EPROM(2MB) [IC10]
125	VHINJM2113M-1	AG		B	IC(NJM2113) [IC12]
126	RCILZ2145XHZZ	AF		C	Coil(HM601) [L100]
127	RCILZ2145XHZZ	AF		C	Coil(HM601) [L101]
128	RCILZ2145XHZZ	AF		C	Coil(HM601) [L102]
129	RCILZ2145XHZZ	AF		C	Coil(HM601) [L103]
130	RCILZ2145XHZZ	AF		C	Coil(HM601) [L104]
131	RCILZ2145XHZZ	AF		C	Coil(HM601) [L105]
132	RCILZ2145XHZZ	AF		C	Coil(HM601) [L106]
133	RCILZ2145XHZZ	AF		C	Coil(HM601) [L107]
134	RCILZ2145XHZZ	AF		C	Coil(HM601) [L108]
135	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [L110]
136	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [L111]
137	VHPSG206S/-1	AG		B	Photo transistor(SG206S) [PI1]
138	VHPSG206S/-1	AG		B	Photo transistor(SG206S) [PI2]
139	VS2SA1037KS-1	AB		B	Transistor(2SA1037KS) [Q2]
140	VS2SC2412KS-1	AB		B	Transistor(2SC2412-K) [Q3]
141	VS2SA1037KS-1	AB		B	Transistor(2SA1037KS) [Q4]
142	VSRNC1402/-1	AC		B	Transistor(RNC1402) [Q7]
143	VRD-HT2HY222J	AA		C	Resistor(1/2W 2.2KΩ ±5%) [R1]
144	VRD-HT2HY222J	AA		C	Resistor(1/2W 2.2KΩ ±5%) [R2]
145	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R100]
146	VRS-TS2AD271J	AA		C	Resistor(1/10W 270Ω ±5%) [R101]
147	VRS-TS2AD101J	AA		C	Resistor(1/10W 100Ω ±5%) [R102]
148	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [R103]
149	VRS-TS2AD471J	AA		C	Resistor(1/10W 470Ω ±5%) [R104]
150	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R105]
151	VRS-TS2AD471J	AA		C	Resistor(1/10W 470Ω ±5%) [R106]
152	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R107]
153	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R108]
154	VRS-TS2AD101J	AA		C	Resistor(1/10W 100Ω ±5%) [R109]
155	VRS-TS2AD104J	AA		C	Resistor(1/10W 100KΩ ±5%) [R110]
156	VRS-TS2AD104J	AA		C	Resistor(1/10W 100KΩ ±5%) [R111]
157	VRS-TS2AD271J	AA		C	Resistor(1/10W 270Ω ±5%) [R113]
158	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R114]
159	VRS-TS2AD471J	AA		C	Resistor(1/10W 470Ω ±5%) [R115]
160	VRS-TS2AD151J	AA		C	Resistor(1/10W 150Ω ±5%) [R116]

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
[7] Control PWB unit					
161	VRS-TS2AD471J	AA		C	Resistor(1/10W 470Ω ±5%) [R117]
162	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R118]
163	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R119]
164	VRS-TS2AD471J	AA		C	Resistor(1/10W 470Ω ±5%) [R120]
165	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R121]
166	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R122]
167	VRS-TS2AD201J	AG		C	Resistor(1/10W 200Ω ±5%) [R123]
168	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R124]
169	VRS-TS2AD271J	AA		C	Resistor(1/10W 270Ω ±5%) [R125]
170	VRS-TS2AD271J	AA		C	Resistor(1/10W 270Ω ±5%) [R126]
171	VRS-TS2AD271J	AA		C	Resistor(1/10W 270Ω ±5%) [R127]
172	VRS-TS2AD223J	AA		C	Resistor(1/10W 22KΩ ±5%) [R128]
173	VRS-TS2AD101J	AA		C	Resistor(1/10W 100Ω ±5%) [R129]
174	VRS-TS2AD101J	AA		C	Resistor(1/10W 100Ω ±5%) [R130]
175	VRS-TS2AD101J	AA		C	Resistor(1/10W 100Ω ±5%) [R131]
176	VRS-TS2AD101J	AA		C	Resistor(1/10W 100Ω ±5%) [R132]
177	VRS-TS2AD101J	AA		C	Resistor(1/10W 100Ω ±5%) [R133]
178	VRS-TS2AD471J	AA		C	Resistor(1/10W 470Ω ±5%) [R134]
179	VRS-TS2AD471J	AA		C	Resistor(1/10W 470Ω ±5%) [R135]
180	VRS-TS2AD471J	AA		C	Resistor(1/10W 470Ω ±5%) [R137]
181	VRS-TS2AD103J	AA		C	Resistor(1/10W 10KΩ ±5%) [R138]
182	VRS-TS2AD471J	AA		C	Resistor(1/10W 470Ω ±5%) [R139]
183	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [R140]
184	VRS-TS2AD103J	AA		C	Resistor(1/10W 10KΩ ±5%) [R141]
185	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R142]
186	VRS-TS2AD471J	AA		C	Resistor(1/10W 470Ω ±5%) [R143]
187	VRS-TS2AD433J	AA		C	Resistor(1/10W 43KΩ ±5%) [R144]
188	VRS-TS2AD303J	AA		C	Resistor(1/10W 30KΩ ±5%) [R145]
189	VRS-TS2AD203J	AA		C	Resistor(1/10W 20KΩ ±5%) [R146]
190	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R147]
191	VRS-TS2AD471J	AA		C	Resistor(1/10W 470Ω ±5%) [R148]
192	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R149]
193	VRS-TS2AD103J	AA		C	Resistor(1/10W 10KΩ ±5%) [R150]
194	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R151]
195	VRS-TS2AD103J	AA		C	Resistor(1/10W 10KΩ ±5%) [R152]
196	VRS-TS2AD101J	AA		C	Resistor(1/10W 100Ω ±5%) [R153]
197	VRS-TS2AD101J	AA		C	Resistor(1/10W 100Ω ±5%) [R154]
198	VRS-TS2AD223J	AA		C	Resistor(1/10W 22KΩ ±5%) [R156]
199	VRS-TS2AD512J	AA		C	Resistor(1/10W 5.1KΩ ±5%) [R157]
200	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [R159]
201	VRS-TS2AD222J	AA		C	Resistor(1/10W 2.2KΩ ±5%) [R160]
202	VRS-TS2AD3R0J	AA		C	Resistor(1/10W 3.0Ω ±5%) [R161]
203	VRS-TS2AD102J	AA		C	Resistor(1/10W 1.0KΩ ±5%) [R162]
204	VRS-TS2AD103J	AA		C	Resistor(1/10W 10KΩ ±5%) [R163]
205	VRS-TS2AD103J	AA		C	Resistor(1/10W 10KΩ ±5%) [R164]
206	VRS-TS2AD512J	AA		C	Resistor(1/10W 5.1KΩ ±5%) [R165]
207	VRS-TS2AD103J	AA		C	Resistor(1/10W 10KΩ ±5%) [R166]
208	VRS-TS2AD106J	AA		C	Resistor(1/10W 10MΩ ±5%) [R167]
209	VRS-TS2AD105J	AA		C	Resistor(1/10W 1.0MΩ ±5%) [R168]
210	VRS-TS2AD121J	AA		C	Resistor(1/10W 120Ω ±5%) [R169]
211	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [R173]
212	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [R176]
213	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [R177]
214	VRS-TS2AD474J	AA		C	Resistor(1/10W 470KΩ ±5%) [R183]
215	VRS-TS2AD754J	AA		C	Resistor(1/10W 750KΩ ±5%) [R184]
216	VRS-TS2AD304J	AA		C	Resistor(1/10W 300KΩ ±5%) [R185]
217	VRS-TS2AD104J	AA		C	Resistor(1/10W 100KΩ ±5%) [R186]
218	VRS-TS2AD393J	AA		C	Resistor(1/10W 39KΩ ±5%) [R188]
219	VRS-TS2AD103J	AA		C	Resistor(1/10W 10KΩ ±5%) [R189]
220	VRS-TS2AD102J	AA		C	Resistor(1/10W 1.0KΩ ±5%) [R190]
221	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [R192]
222	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [R193]
223	VRS-TS2AD473J	AA		C	Resistor(1/10W 47KΩ ±5%) [R196]
224	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [R197]
225	VRS-TS2AD104J	AA		C	Resistor(1/10W 100KΩ ±5%) [R198]
226	VRS-TS2AD153J	AA		C	Resistor(1/10W 15KΩ ±5%) [R199]
227	VRS-TS2AD104J	AA		C	Resistor(1/10W 100KΩ ±5%) [R201]
228	VRS-TS2AD204J	AA		C	Resistor(1/10W 200KΩ ±5%) [R202]
229	VRS-TS2AD302J	AA		C	Resistor(1/10W 3KΩ ±5%) [R203]
230	VRS-TS2AD103J	AA		C	Resistor(1/10W 10KΩ ±5%) [R204]
231	VRS-TS2AD203J	AA		C	Resistor(1/10W 20KΩ ±5%) [R205]
232	VRS-TS2AD474J	AA		C	Resistor(1/10W 470KΩ ±5%) [R208]
233	VRS-TS2AD203J	AA		C	Resistor(1/10W 20KΩ ±5%) [R209]
234	VRS-TS2AD224J	AA		C	Resistor(1/10W 220KΩ ±5%) [R210]
235	VRS-TS2AD562J	AA		C	Resistor(1/10W 5.6KΩ ±5%) [R211]
236	VRS-TS2AD271J	AA		C	Resistor(1/10W 270Ω ±5%) [R213]
237	VRS-TS2AD271J	AA		C	Resistor(1/10W 270Ω ±5%) [R214]
238	VRS-TS2AD271J	AA		C	Resistor(1/10W 270Ω ±5%) [R215]
239	VRS-TS2AD271J	AA		C	Resistor(1/10W 270Ω ±5%) [R216]
240	VRS-TS2AD271J	AA		C	Resistor(1/10W 270Ω ±5%) [R217]

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
[7] Control PWB unit					
241	VRS-TS2AD271J	AA		C	Resistor(1/10W 270Ω ±5%) [R218]
242	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R219]
243	VRS-TS2AD333J	AA		C	Resistor(1/10W 33KΩ ±5%) [R220]
244	RR-TZ3017SCZZ	AC		C	Block resistor(270Ωx4) [RA1]
245	RR-TZ3018SCZZ	AC		C	Block resistor(470Ωx4) [RA2]
246	RR-TZ3017SCZZ	AC		C	Block resistor(270Ωx4) [RA3]
247	RR-TZ3017SCZZ	AC		C	Block resistor(270Ωx4) [RA4]
248	RR-TZ3018SCZZ	AC		C	Block resistor(470Ωx4) [RA5]
249	RR-TZ3017SCZZ	AC		C	Block resistor(270Ωx4) [RA6]
250	RR-TZ3017SCZZ	AC		C	Block resistor(270Ωx4) [RA7]
251	RR-TZ3017SCZZ	AC		C	Block resistor(270Ωx4) [RA8]
252	RR-TZ3018SCZZ	AC		C	Block resistor(470Ωx4) [RA9]
253	RR-TZ3018SCZZ	AC		C	Block resistor(470Ωx4) [RA10]
254	RR-TZ3018SCZZ	AC		C	Block resistor(470Ωx4) [RA11]
255	RR-TZ3017SCZZ	AC		C	Block resistor(270Ωx4) [RA12]
256	RR-TZ3017SCZZ	AC		C	Block resistor(270Ωx4) [RA13]
257	RR-TZ3018SCZZ	AC		C	Block resistor(470Ωx4) [RA14]
258	RR-TZ3018SCZZ	AC		C	Block resistor(470Ωx4) [RA15]
259	RR-TZ3018SCZZ	AC		C	Block resistor(470Ωx4) [RA16]
260	VH62FP332P-1	AF		B	IC(XC62FP3302P) [REQ100]
261	RRLYD3138XHZZ	AG		B	Relay(DQ1U24VDC) [RY1]
262	RCRSQ2157SCZZ	AF		B	Crystal(32.256MHz) [X1]
263	RCRSB0297AFZZ (Unit)	AD		B	Crystal(32.768kHz) [X2]
901	DCEKC686NXHZZ	BA	N	E	Control PWB unit(Within ROM)
[8] TEL/LIU PWB unit					
1	VHVDSS301L-U	AF		B	Varistor(DSS-301L) [AR1]
2	QCNW-4753XHZZ	AE		C	Cable [ARG]
3	RC-FZ2023SCZZ	AF		C	Capacitor(250WV 1.5μF) [C2]
4	RC-FZ3028SCZZ	AG		C	Capacitor(250WV 0.56μF) [C3]
5	VCEAGA1HW106M	AA		C	Capacitor(50WV 10μF) [C4]
6	VCEAGA1HW475M	AA		C	Capacitor(50WV 4.7μF) [C5]
7	VCEAGA1HW226M	AB		C	Capacitor(50WV 22μF) [C6]
8	VCEAGA1HW106M	AA		C	Capacitor(50WV 10μF) [C7]
9	VCEAGA1HW226M	AB		C	Capacitor(50WV 22μF) [C10]
10	VCEAGA1HW107M	AA		C	Capacitor(50WV 100μF) [C12]
11	VCEAGA1HW107M	AA		C	Capacitor(50WV 100μF) [C13]
12	VCKYTQ1HB223K	AB		C	Capacitor(50WV 0.022μF) [C103]
13	VCKYTV1HB103K	AB		C	Capacitor(50WV 0.01μF) [C104]
14	VCKYTV1HB103K	AB		C	Capacitor(50WV 0.01μF) [C105]
15	VCKYTV1HB473K	AA		C	Capacitor(50WV 0.047μF) [C106]
16	VCKYTV1HB102K	AA		C	Capacitor(50WV 1000PF) [C107]
17	VCKYTV1HB152K	AA		C	Capacitor(50WV 1500PF) [C108]
18	VCKYTV1HB221K	AA		C	Capacitor(50WV 220PF) [C109]
19	VCKYTV1HF104Z	AA		C	Capacitor(50WV 0.1μF) [C110]
20	VCKYTV1HB102K	AA		C	Capacitor(50WV 1000PF) [C111]
21	VCKYTV1HF104Z	AA		C	Capacitor(50WV 0.1μF) [C112]
22	VCKYTV1HB102K	AA		C	Capacitor(50WV 1000PF) [C113]
23	VCKYTV1HF104Z	AA		C	Capacitor(50WV 0.1μF) [C114]
24	VCCCTV1HH101J	AA		C	Capacitor(50WV 100PF) [C115]
25	VCKYTV1HF104Z	AA		C	Capacitor(50WV 0.1μF) [C117]
26	VCKYTV1HF104Z	AA		C	Capacitor(50WV 0.1μF) [C118]
27	VCKYTV1HB821K	AA		C	Capacitor(50WV 820PF) [C120]
28	VCKYTV1HB102K	AA		C	Capacitor(50WV 1000PF) [C121]
29	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [C122]
30	VCKYTQ1HB333K	AA		C	Capacitor(50WV 0.033μF) [C123]
31	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [C124]
32	VCKYTQ1HB104K	AB		C	Capacitor(50WV 0.1μF) [C125]
33	VCKYTQ1HB223K	AB		C	Capacitor(50WV 0.022μF) [C126]
34	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [C127]
35	RRLYZ3427SCZZ	AN		B	Relay [CML2]
36	QJAKZ2079XH0D	AD		C	Jack [CNHJ]
37	QCNCM2548SC1B	AH		C	Connector(12pin) [CNLIUA]
38	QCNCM2548SC0D	AF		C	Connector(4pin) [CNLIUB]
39	QJAKZ2060SC0B	AD		C	Jack [CNLNUJ]
40	QJAKZ2060SC0B	AD		C	Jack [CNTLJ]
42	VHDDSS133//1	AA		B	Diode(1SS133) [D1]
43	VHDDSS133//1	AA		B	Diode(1SS133) [D2]
44	VHDDSS133//1	AA		B	Diode(1SS133) [D3]
45	VHDDSS133//1	AA		B	Diode(1SS133) [D4]
46	QSW-Z2263XHZZ	AG		B	Hook switch [HOOK SW]
47	VHINJM2904M-2	AG		B	IC(NJM2904M) [IC101]
48	VHINJM2904M-2	AG		B	IC(NJM2904M) [IC102]
49	RCILZ2120SCZZ	AD		C	Coil(4.7mH) [L5]
50	RFILN2027XHZZ	AC		C	Coil(R-5C) [L6]

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
[8] TEL/LIU PWB unit					
51	RFILN2027XHZZ	AC		C	Coil(R-5C) [L7]
52	RFILN2027XHZZ	AC		C	Coil(R-5C) [L8]
53	VHPTLP627//1	AH		B	Photo coupler(TLP627) [PC1]
54	VHPTLP521-1BL	AE		B	Photo coupler(TLP521) [PC2]
55	VHPTLP521-1BL	AE		B	Photo coupler(TLP521) [PC5]
56	VSBS108///1	AE		B	FET(BS108) [Q1]
57	VS2SC2412KR-1	AD		B	Transistor(2SC2412K) [Q101]
58	VSRNC1402//1	AC		B	Transistor(RNC1402) [Q104]
59	VSRNC1402//1	AC		B	Transistor(RNC1402) [Q105]
60	VSRNC1402//1	AC		B	Transistor(RNC1402) [Q106]
61	VSRNC1402//1	AC		B	Transistor(RNC1402) [Q107]
62	VRD-HT2HY223J	AA		C	Resistor(1/2W 22KΩ ±5%) [R3]
63	VRS-TS2AD433J	AA		C	Resistor(1/10W 43KΩ ±5%) [R101]
64	VRS-TP2BD150J	AA		C	Resistor(1/8W 15Ω ±5%) [R102]
65	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [R103]
66	VRS-TS2AD103J	AA		C	Resistor(1/10W 10KΩ ±5%) [R104]
67	VRS-TS2AD153J	AA		C	Resistor(1/10W 15KΩ ±5%) [R105]
68	VRS-TP2BD150J	AA		C	Resistor(1/8W 15Ω ±5%) [R107]
69	VRS-TS2AD152J	AA		C	Resistor(1/10W 1.5KΩ ±5%) [R108]
70	VRS-TS2AD102J	AA		C	Resistor(1/10W 1KΩ ±5%) [R109]
71	VRS-TS2AD512J	AA		C	Resistor(1/10W 5.1KΩ ±5%) [R110]
72	VRS-TS2AD203J	AA		C	Resistor(1/10W 20KΩ ±5%) [R111]
73	VRS-TS2AD102J	AA		C	Resistor(1/10W 1KΩ ±5%) [R112]
74	VRS-TS2AD203J	AA		C	Resistor(1/10W 20KΩ ±5%) [R113]
75	VRS-TS2AD563J	AA		C	Resistor(1/10W 56KΩ ±5%) [R114]
76	VRS-TS2AD204J	AA		C	Resistor(1/10W 200KΩ ±5%) [R115]
77	VRS-TS2AD332J	AA		C	Resistor(1/10W 3.3KΩ ±5%) [R116]
78	VRS-TS2AD101J	AA		C	Resistor(1/10W 100Ω ±5%) [R117]
79	VRS-TS2AD101J	AA		C	Resistor(1/10W 100Ω ±5%) [R118]
80	VRS-TS2AD471J	AA		C	Resistor(1/10W 470Ω ±5%) [R119]
81	VRS-TS2AD471J	AA		C	Resistor(1/10W 470Ω ±5%) [R120]
82	VRS-TS2AD104J	AA		C	Resistor(1/10W 100KΩ ±5%) [R122]
83	VRS-TS2AD151J	AA		C	Resistor(1/10W 150Ω ±5%) [R123]
84	VRS-TS2AD222J	AA		C	Resistor(1/10W 2.2KΩ ±5%) [R124]
85	VRS-TS2AD332J	AA		C	Resistor(1/10W 3.3KΩ ±5%) [R125]
86	VRS-TS2AD823J	AA		C	Resistor(1/10W 82KΩ ±5%) [R126]
87	VRS-TS2AD243J	AA		C	Resistor(1/10W 24KΩ ±5%) [R127]
88	VRS-TS2AD822J	AA		C	Resistor(1/10W 8.2KΩ ±5%) [R128]
89	VRS-TS2AD621J	AA		C	Resistor(1/10W 620Ω ±5%) [R129]
90	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [R130]
91	VRS-TS2AD332J	AA		C	Resistor(1/10W 3.3KΩ ±5%) [R131]
92	VRS-TS2AD000J	AA		C	Resistor(1/10W 0Ω ±5%) [R132]
93	VRS-TS2AD271J	AA		C	Resistor(1/10W 270Ω ±5%) [R133]
94	VRS-TS2AD223J	AA		C	Resistor(1/10W 22KΩ ±5%) [R134]
95	VRS-TS2AD102J	AA		C	Resistor(1/10W 1KΩ ±5%) [R135]
96	VRS-TS2AD222J	AA		C	Resistor(1/10W 2.2KΩ ±5%) [R137]
97	VRS-TS2AD271J	AA		C	Resistor(1/10W 270Ω ±5%) [R138]
98	VRS-TS2AD511J	AA		C	Resistor(1/10W 510Ω ±5%) [R139]
99	VRS-TS2AD223J	AA		C	Resistor(1/10W 22KΩ ±5%) [R140]
100	VRS-TS2AD473J	AA		C	Resistor(1/10W 47KΩ ±5%) [R141]
101	VRS-TS2AD332J	AA		C	Resistor(1/10W 3.3KΩ ±5%) [R142]
102	VRS-TS2AD243J	AA		C	Resistor(1/10W 24KΩ ±5%) [R143]
103	VRS-TS2AD103J	AA		C	Resistor(1/10W 10KΩ ±5%) [R144]
104	RH-DX2007SCZZ	AC		B	Diode bridge(S1ZB60) [REC1]
105	RTRNI2165XHZZ	AG		B	Transformer [T1]
106	VHVRA501PV6-1	AE		B	Varistor(RA-501P-V6-2) [VA1]
107	VHVRA501PV6-1	AE		B	Varistor(RA-501P-V6-2) [VA2]
108	VHEMTZJ6R8B-1	AC		B	Zener diode(MTZJ6R8B) [ZD1]
109	VHEMTZJ300B-1	AA		B	Zener diode(MTZJ30B) [ZD2]
110	VHEMTZJ200B-1	AC		B	Zener diode(MTZJ20B) [ZD4]
111	VHEMTZJ4R7B-1	AC		B	Zener diode(MTZJ4R7B) [ZD7]
112	VHEMTZJ4R7B-1	AC		B	Zener diode(MTZJ4R7B) [ZD8]
	(Unit)				
901	DCEKL483BXH11	BD		E	TEL/Liu PWB unit
[9] Power supply PWB unit					
1	0CBUGFM224KR/	AF		C	Capacitor(RE224-C) [C1]
2	0CBUGZ1072ZZ/	AN		C	Capacitor(KMF400VB68M) [C2]
3	0CBUGCV102HZ/	AD		C	Capacitor(ECKZ3D102KBP) [C3]
4	0CBUGXAEF222/	AC		C	Capacitor(GRM40B222K50PT) [C4]
5	0CBUEXCAO000/	AB		C	Resistor(MCR10EZJH000) [C6]
6	0CBUGCM392BJ/	AF		C	Capacitor(DE1510-1E392M-KX) [C7]
7	0CBUGAE561TS/	AH		C	Capacitor(LXJ35VB560(M)) [C8]
8	0CBUGFF474JA/	AF		C	Capacitor(ECQV1H474JL3) [C9]
9	0CBUGAC222VV/	AK		C	Capacitor(LXZ16VB2200(K)) [C10]
10	0CBUGXAED104/	AC		C	Capacitor(GRM40B104K25PT) [C12]
11	0CBUGZ1041ZZ/	AF		C	Capacitor(DE1007E222M-KH) [C15]
12	0CBUGAB101RV/	AF		C	Capacitor(KME10VB100(M)) [C16]
13	0CBUGXAEF102/	AC		C	Capacitor(GRM40B102K50PT) [C17]
14	0CBUGCU681BR/	AC		C	Capacitor(DEO805R681K1K-MHR) [C21]

[illegible]

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PARTS CODE	No.	PRICE RANK	NEW MARK	PART RANK
[C]				
CCNW-212AXH01	1-2	AK		C
"	3-1	AK		C
CCNW-215AXH01	1-12	AG		C
[D]				
DCEKC686NXHZZ	1-45	BA	N	E
"	7-901	BA	N	E
DCEKL483BXH11	1-16	BD		E
"	8-901	BD		E
DCEKP481BXH52	1-1	BB	N	E
"	3-901	BB	N	E
DCEKP482BXH03	3-7	BB	N	E
DUNTK468BXHBG	6-2	AH		E
[G]				
GCABA2342XHSM	3-3	AH	N	D
GCABB2343XHSA	1-13	AK		D
GCASP2110XHSD	1-17	AK		C
GCASP2111XHSA	1-18	AH		C
GDAI-2082XHSA	1-46	AD		C
GDAI-2083XHZZ	1-22	AF		C
[H]				
HPNLH2393XHSC	1-54	AF	N	D
[J]				
JBTN-2257XHSA	3-4	AD		C
JBTN-2258XHSA	3-5	AC		C
JBTN-2261XHSA	3-6	AC		C
JBTN-2262XHSA	3-8	AC	N	C
[L]				
LBNDJ2006XHZZ	1-55	AA		C
"	2-19	AA		C
LBSHP2110XHZZ	2-1	AB		C
LBSHP2112XHZZ	1-28	AB		C
LFRM-2206XHZZ	5-1	AF		C
LFRM-2208XHZZ	1-29	AF		C
LFRM-2209XHZZ	2-2	AF		C
LHLDZ2180XHZZ	2-3	AC		C
LHLDZ2181XHZZ	2-4	AC		C
LHLDZ2184XHZZ	1-30	AC		C
LHLDZ2185XHZZ	1-31	AC		C
LPLTG2911XHZZ	4-1	AE		C
LPLTM3049XHZZ	5-2	AD		C
LPLTM3107XHZZ	1-63	AD	N	C
LPLTP2908XHZZ	4-2	AE		C
LPLTP3050XHZZ	5-3	AB		C
LPLTP3051XHZZ	4-3	AB		C
LSTPP2054XHZZ	1-47	AC		C
LX-BZ2138XHZZ	1-B1	AB		C
[M]				
MARMP2023XHZZ	1-48	AB		C
MCAMP2027XHZZ	5-4	AC		C
MLEVP2311XHZZ	5-5	AB		C
MLEVP2312XHZZ	5-6	AB		C
MLEVP2313XHZZ	5-7	AC		C
MLEVP2314XHZZ	5-8	AB		C
MLEVP2315XHZA	1-32	AC	N	C
MLEVP2316XHZZ	1-23	AC		C
MLEVP2317XHZZ	2-5	AB		C
MLEVP2319XHZZ	1-49	AC		C
MLEVP2320XHZZ	1-19	AC		C
MSPRC2735XHZZ	5-9	AC		C
MSPRC2954XHZZ	1-5	AC		C
MSPRC3110XHZZ	5-10	AB		C
MSPRC3112XHZZ	1-33	AC		C
MSPRC3117XHZZ	2-6	AB		C
MSPRC3127XHZZ	5-11	AB		C
MSPRC3148XHZZ	1-34	AC		C
MSPRD3115XHZZ	1-35	AB		C
MSPRD3116XHZZ	1-24	AB		C
MSPRD3169XHZZ	1-57	AD		C
MSPRP3119XHZZ	1-14	AC		C
MSPRP3123XHZZ	1-15	AC		C
MSPRT3114XHZZ	1-25	AC		C
MSPRT3139XHZZ	4-5	AA		C
MSPRT3140XHZZ	4-4	AA		C
[N]				
NGERH2278XHZZ	5-12	AC		C
NGERH2379XHZZ	5-13	AC		C
NGERH2380XHZZ	5-14	AC		C
NGERH2391XHZZ	5-15	AC		C
NGERH2451XHZZ	5-16	AB		C

PARTS CODE	No.	PRICE RANK	NEW MARK	PART RANK
NGERH2475XHZZ	5-17	AB		C
NGERH2476XHZZ	5-18	AB		C
NGERH2477XHZZ	1-50	AC		C
NGERH2478XHZZ	1-36	AB		C
NGERH2479XHZZ	2-7	AB		C
NGERH2480XHZZ	2-8	AB		C
NGERH2481XHZZ	2-9	AB		C
NGERP2318XHZZ	1-6	AD		C
NROLP2426XHZZ	1-26	AC		C
NROLR2375XHZZ	2-10	AL		C
NROLR2425XHZZ	1-37	AP		C
NROLR2427XHZZ	1-42	AC		C
NROLR2428XHZZ	2-11	AP		C
NSFTZ2273XHZZ	2-12	AF		C
[P]				
PCUSU2132XHZZ	1-59	AC		C
PCUT-2040SCZZ	1-51	AV		C
PGIDM2554XHZZ	4-6	AF		C
PGIDM2558XHZZ	1-38	AD		C
PGIDM2559XHSA	1-27	AE		C
PGIDM2560XHSA	1-7	AC		C
PGIDM2561XHSA	1-8	AC		C
PGIDM2562XHZZ	2-13	AD		C
PGIDM2564XHZZ	1-44	AD		C
PGIDM2566XHZZ	1-52	AC		C
PGIDM2578XHZZ	6-22	AE		C
PGIDM2579XHZZ	6-21	AE		C
PGUMR2168XHZZ	1-43	AF		C
PHOP-2104XHSA	1-9	AF		C
PHOP-2105XHZZ	6-4	AD		C
PSHEZ3410XHZZ	1-56	AB		C
PSHEZ3510XHZZ	4-7	AE		C
PSHEZ3543XHZZ	2-21	AE	N	C
[Q]				
QACCR2048XHZZ	1-20	AX		B
QCNCM2401SC0B	7-106	AA		C
QCNCM2442SC0B	7-97	AB		C
QCNCM2548SC0D	8-38	AF		C
QCNCM2548SC1B	8-37	AH		C
QCNCM7014SC0B	7-100	AD		C
QCNCM7014SC0C	7-98	AA		C
QCNCM7014SC0F	7-103	AB		C
QCNCM7014SC0G	7-96	AB		C
QCNCM7014SC1F	7-104	AD		C
"	7-107	AD		C
QCNCM705BAF06	7-99	AB		C
QCNCW2500SC0D	7-102	AG		C
QCNCW2500SC0H	7-105	AF		C
QCNCW2500SC1B	7-101	AF		C
QCNW-207AXHZZ	5-19	AC		C
QCNW-209AXHZZ	1-39	AH		C
QCNW-210AXHZZ	1-40	AC		C
QCNW-211AXHZZ	2-15	AF		C
QCNW-213AXHZZ	2-16	AC		C
QCNW-352AXHZZ	2-22	AH	N	C
QCNW-3975XHG	6-5	AG		C
QCNW-3976XHBG	6-3	AK		C
QCNW-4753XHZZ	8-2	AE		C
QCNW-4933XHZZ	5-20	AC		C
QFS-P2010SCZZ	7-114	AD		B
QJAKZ2060SC0B	8-39	AD		C
"	8-40	AD		C
QJAKZ2079XH0D	8-36	AD		C
QSOCZ2051SC32	7-123	AC		C
QSW-F2224SCZZ	5-21	AE		B
QSW-M2293XHZZ	2-17	AE		B
QSW-M2296XHZZ	1-11	AD		B
QSW-Z2263XHZZ	8-46	AG		B
[R]				
RC-FZ2023SCZZ	8-3	AF		C
RC-FZ3028SCZZ	8-4	AG		C
RCILZ2120SCZZ	8-49	AD		C
RCILZ2145XHZZ	7-70	AF		C
"	7-71	AF		C
"	7-126	AF		C
"	7-127	AF		C
"	7-128	AF		C
"	7-129	AF		C
"	7-130	AF		C
"	7-131	AF		C

PARTS CODE	No.	PRICE RANK	NEW MARK	PART RANK
RCILZ2145XHZZ	7-132	AF		C
"	7-133	AF		C
"	7-134	AF		C
RCORF2123XHZZ	2-20	AD		B
RCORF2125XHZZ	1-53	AE		B
RCRSB0297AFZZ	7-263	AD		B
RCRSQ2157SCZZ	7-262	AF		B
RDENT2144XHZZ	1-21	BA		E
"	9-901	BA		E
RFILN2027XHZZ	8-50	AC		C
"	8-51	AC		C
"	8-52	AC		C
RH-DX2007SCZZ	8-104	AC		B
RHEDZ2059XHZZ	1-41	BF		B
RMOTZ2148XHZZ	5-22	AT		B
RR-TZ3017SCZZ	7-244	AC		C
"	7-246	AC		C
"	7-247	AC		C
"	7-249	AC		C
"	7-250	AC		C
"	7-251	AC		C
"	7-255	AC		C
"	7-256	AC		C
RR-TZ3018SCZZ	7-245	AC		C
"	7-248	AC		C
"	7-252	AC		C
"	7-253	AC		C
"	7-254	AC		C
"	7-257	AC		C
"	7-258	AC		C
"	7-259	AC		C
RRLYD3138XHZZ	7-261	AG		B
RRLYZ3427SCZZ	8-35	AN		B
RTRNI2165XHZZ	8-105	AG		B
RUNTZ2054XHZZ	2-18	BE		B
[S]				
SPAKA287BXHZZ	6-7	AE		D
SPAKA288BXHZZ	6-8	AE		D
SPAKA289BXHZZ	6-9	AC		D
SPAKA388BXHZZ	6-19	AE		D
SPAKA389BXHZZ	6-20	AE		D
SPAKC225BXHZZ	6-10	AP	N	D
SPAKP296BXHZZ	6-6	AE		D
[T]				
TCADZ2935XHZZ	6-18	AA		D
TINSS4042XHZZ	6-1	AS	N	D
TLABM358AXHZZ	6-11	AS	N	D
TPAPK2238XHZZ	6-25	AS	N	S
[U]				
UBATL2046SCZZ	7-1	AK		B
[V]				
VCCCTV1HH100D	7-9	AA		C
"	7-10	AA		C
VCCCTV1HH101J	8-24	AA		C
VCCCTV1HH180J	7-63	AA		C
VCCCTV1HH220J	7-34	AA		C
"	7-35	AA		C
"	7-64	AA		C
"	7-66	AA		C
"	7-67	AA		C
"	7-68	AA		C
"	7-77	AA		C
"	7-78	AA		C
VCEAGA1EW476M	7-3	AA		C
"	7-5	AA		C
"	7-8	AA		C
VCEAGA1HW106M	7-2	AA		C
"	7-4	AA		C
"	7-6	AA		C
"	8-5	AA		C
"	8-8	AA		C
VCEAGA1HW107M	8-10	AA		C
"	8-11	AA		C
VCEAGA1HW226M	7-7	AB		C
"	8-7	AB		C
"	8-9	AB		C
VCEAGA1HW475M	8-6	AA		C
VCKYTQ1HB104K	8-32	AB		C
VCKYTQ1HB223K	8-12	AB		C
"	8-33	AB		C

PARTS CODE	No.	PRICE RANK	NEW MARK	PART RANK
VCKYTQ1HB333K	8-30	AA		C
VCKYTV1CF105Z	7-15	AB		C
"	7-18	AB		C
"	7-19	AB		C
"	7-25	AB		C
"	7-26	AB		C
"	7-28	AB		C
"	7-29	AB		C
"	7-31	AB		C
"	7-32	AB		C
"	7-39	AB		C
"	7-41	AB		C
"	7-42	AB		C
"	7-43	AB		C
"	7-44	AB		C
"	7-45	AB		C
"	7-46	AB		C
"	7-48	AB		C
"	7-49	AB		C
"	7-51	AB		C
"	7-53	AB		C
"	7-57	AB		C
"	7-59	AB		C
"	7-60	AB		C
"	7-65	AB		C
"	7-72	AB		C
"	7-73	AB		C
"	7-75	AB		C
"	7-87	AB		C
"	7-89	AB		C
VCKYTV1EB104K	7-56	AA		C
"	7-83	AA		C
"	7-88	AA		C
"	7-91	AA		C
VCKYTV1EF104Z	7-16	AA		C
"	7-17	AA		C
"	7-21	AA		C
"	7-27	AA		C
"	7-33	AA		C
"	7-37	AA		C
"	7-38	AA		C
"	7-47	AA		C
"	7-50	AA		C
"	7-54	AA		C
"	7-55	AA		C
"	7-58	AA		C
"	7-61	AA		C
"	7-76	AA		C
"	7-93	AA		C
"	7-95	AA		C
VCKYTV1HB102K	7-11	AA		C
"	7-12	AA		C
"	7-13	AA		C
"	7-14	AA		C
"	7-20	AA		C
"	7-52	AA		C
"	7-80	AA		C
"	7-81	AA		C
"	7-84	AA		C
"	8-16	AA		C
"	8-20	AA		C
"	8-22	AA		C
"	8-28	AA		C
VCKYT1HB103K	7-30	AB		C
"	7-92	AB		C
"	8-13	AB		C
"	8-14	AB		C
VCKYTV1HB152K	8-17	AA		C
VCKYTV1HB221K	7-86	AA		C
"	8-18	AA		C
VCKYTV1HB222K	7-22	AA		C
"	7-23	AA		C
"	7-24	AA		C
"	7-40	AA		C
"	7-62	AA		C
"	7-69	AA		C
VCKYTV1HB472K	7-74	AA		C
VCKYTV1HB473K	8-15	AA		C
VCKYTV1HB821K	8-27	AA		C
VCKYTV1HF104Z	7-36	AA		C

PARTS CODE	No.	PRICE RANK	NEW MARK	PART RANK
VCKYTV1HF104Z	7-94	AA		C
"	8-19	AA		C
"	8-21	AA		C
"	8-23	AA		C
"	8-25	AA		C
"	8-26	AA		C
VHDDSS133/-1	8-42	AA		B
"	8-43	AA		B
"	8-44	AA		B
"	8-45	AA		B
VHDHRW0202B-1	7-113	AD		C
VHD1SS355/-1	7-109	AB		B
"	7-110	AB		B
"	7-111	AB		B
"	7-112	AB		B
VHEMTZJ200B-1	8-110	AC		B
VHEMTZJ300B-1	8-109	AA		B
VHEMTZJ4R7B-1	8-111	AC		B
"	8-112	AC		B
VHEMTZJ6R8B-1	8-108	AC		B
VHIFC2FM209V1	7-117	BK	N	B
"	7-119	BK	N	B
VHIHCF4051M1T	7-122	AG		B
VHIKM29W040-1	7-118	AV		B
VHINJM2113M-1	7-125	AG		B
VHINJM2904M-2	8-47	AG		B
"	8-48	AG		B
VHITC7WT74FU1	7-116	AF		B
VHIULN2003AN/	7-115	AE		B
VHIW2425S7LE	7-120	AQ		B
VHIXC61AN45M1	7-121	AE		B
VHI27020FNY0A	7-124	BN	N	B
VHI62FP332P-1	7-260	AF		B
VHPSG206S/-1	7-137	AG		B
"	7-138	AG		B
VHPTLP521-1BL	8-54	AE		B
"	8-55	AE		B
VHPTLP627/-1	8-53	AH		B
VHVDSS301L/U	8-1	AF		B
VHVRA501PV6-1	8-106	AE		B
"	8-107	AE		B
VRD-HT2HY222J	7-143	AA		C
"	7-144	AA		C
VRD-HT2HY223J	8-62	AA		C
VRS-HT3AA101J	7-108	AA		C
VRS-TP2BD150J	8-64	AA		C
"	8-68	AA		C
VRS-TS2AD000J	7-79	AA		C
"	7-82	AA		C
"	7-85	AA		C
"	7-90	AA		C
"	7-135	AA		C
"	7-136	AA		C
"	7-148	AA		C
"	7-183	AA		C
"	7-200	AA		C
"	7-211	AA		C
"	7-212	AA		C
"	7-213	AA		C
"	7-221	AA		C
"	7-222	AA		C
"	7-224	AA		C
"	8-29	AA		C
"	8-31	AA		C
"	8-34	AA		C
"	8-65	AA		C
"	8-90	AA		C
"	8-92	AA		C
VRS-TS2AD101J	7-147	AA		C
"	7-154	AA		C
"	7-173	AA		C
"	7-174	AA		C
"	7-175	AA		C
"	7-176	AA		C
"	7-177	AA		C
"	7-196	AA		C
"	7-197	AA		C
"	8-78	AA		C
"	8-79	AA		C
VRS-TS2AD102J	7-203	AA		C

PARTS CODE	No.	PRICE RANK	NEW MARK	PART RANK
VRS-TS2AD102J	7-220	AA		C
"	8-70	AA		C
"	8-73	AA		C
"	8-95	AA		C
VRS-TS2AD103J	7-181	AA		C
"	7-184	AA		C
"	7-193	AA		C
"	7-195	AA		C
"	7-204	AA		C
"	7-205	AA		C
"	7-207	AA		C
"	7-219	AA		C
"	7-230	AA		C
"	8-66	AA		C
"	8-103	AA		C
VRS-TS2AD104J	7-155	AA		C
"	7-156	AA		C
"	7-217	AA		C
"	7-225	AA		C
"	7-227	AA		C
"	8-82	AA		C
VRS-TS2AD105J	7-209	AA		C
VRS-TS2AD106J	7-208	AA		C
VRS-TS2AD121J	7-210	AA		C
VRS-TS2AD151J	7-160	AA		C
"	8-83	AA		C
VRS-TS2AD152J	8-69	AA		C
VRS-TS2AD153J	7-226	AA		C
"	8-67	AA		C
VRS-TS2AD201J	7-167	AG		C
VRS-TS2AD203J	7-189	AA		C
"	7-231	AA		C
"	7-233	AA		C
"	8-72	AA		C
"	8-74	AA		C
VRS-TS2AD204J	7-228	AA		C
"	8-76	AA		C
VRS-TS2AD222J	7-201	AA		C
"	8-84	AA		C
"	8-96	AA		C
VRS-TS2AD223J	7-172	AA		C
"	7-198	AA		C
"	8-94	AA		C
"	8-99	AA		C
VRS-TS2AD224J	7-234	AA		C
VRS-TS2AD243J	8-87	AA		C
"	8-102	AA		C
VRS-TS2AD271J	7-146	AA		C
"	7-157	AA		C
"	7-169	AA		C
"	7-170	AA		C
"	7-171	AA		C
"	7-236	AA		C
"	7-237	AA		C
"	7-238	AA		C
"	7-239	AA		C
"	7-240	AA		C
"	7-241	AA		C
"	8-93	AA		C
"	8-97	AA		C
VRS-TS2AD3R0J	7-202	AA		C
VRS-TS2AD302J	7-229	AA		C
VRS-TS2AD303J	7-188	AA		C
VRS-TS2AD304J	7-216	AA		C
VRS-TS2AD332J	8-77	AA		C
"	8-85	AA		C
"	8-91	AA		C
"	8-101	AA		C
VRS-TS2AD333J	7-145	AA		C
"	7-150	AA		C
"	7-152	AA		C
"	7-153	AA		C
"	7-158	AA		C
"	7-162	AA		C
"	7-163	AA		C
"	7-165	AA		C
"	7-166	AA		C
"	7-168	AA		C
"	7-185	AA		C
"	7-190	AA		C

PARTS CODE	No.	PRICE RANK	NEW MARK	PART RANK
VRS-TS2AD333J	7-192	AA		C
"	7-194	AA		C
"	7-242	AA		C
"	7-243	AA		C
VRS-TS2AD393J	7-218	AA		C
VRS-TS2AD433J	7-187	AA		C
"	8-63	AA		C
VRS-TS2AD471J	7-149	AA		C
"	7-151	AA		C
"	7-159	AA		C
"	7-161	AA		C
"	7-164	AA		C
"	7-178	AA		C
"	7-179	AA		C
"	7-180	AA		C
"	7-182	AA		C
"	7-186	AA		C
"	7-191	AA		C
"	8-80	AA		C
"	8-81	AA		C
VRS-TS2AD473J	7-223	AA		C
"	8-100	AA		C
VRS-TS2AD474J	7-214	AA		C
"	7-232	AA		C
VRS-TS2AD511J	8-98	AA		C
VRS-TS2AD512J	7-199	AA		C
"	7-206	AA		C
"	8-71	AA		C
VRS-TS2AD562J	7-235	AA		C
VRS-TS2AD563J	8-75	AA		C
VRS-TS2AD621J	8-89	AA		C
VRS-TS2AD754J	7-215	AA		C
VRS-TS2AD822J	8-88	AA		C
VRS-TS2AD823J	8-86	AA		C
VSBS108///-1	8-56	AE		B
VSRNC1402// -1	7-142	AC		B
"	8-58	AC		B
"	8-59	AC		B
"	8-60	AC		B
"	8-61	AC		B
VS2SA1037KS-1	7-139	AB		B
"	7-141	AB		B

PARTS CODE	No.	PRICE RANK	NEW MARK	PART RANK
VS2SC2412KR-1	8-57	AD		B
VS2SC2412KS-1	7-140	AB		B
[X]				
XBBS30P06000	1-B4	AA		C
XBPSN40P06K00	1-B5	AA		C
XEBSD30P08000	1-B3	AA		C
"	5-B3	AA		C
XEBSD30P12000	1-B7	AA		C
XHBSD30P06000	1-B6	AA		C
XUBSD20P06000	3-B2	AA		C
[O]				
0CBBFZ89256Z/	9-28	AD		B
0CBLRZ6616ZN/	9-33	AQ		C
0CBLRZ6619ZQ/	9-34	AQ		C
0CBPCZ0275ZZ/	9-17	AD		C
0CBPJCEJ1601/	9-25	AH		A
"	9-26	AH		A
0CBPKZ0194ZZ/	9-16	AC		C
0CBPZZ0906ZZ/	9-27	AH		A
0CBPZZ0940ZZ/	9-32	AB		C
0CBUAC0289AK/	9-41	AD		B
"	9-42	AD		B
0CBUAG0161AC/	9-37	AQ		B
0CBUAY0016CK/	9-39	AD		B
"	9-40	AD		B
0CBUBC0125DK/	9-18	AD		B
"	9-19	AD		B
"	9-20	AD		B
"	9-21	AD		B
0CBUBC0302BZ/	9-24	AE		B
0CBUBC0336AZ/	9-23	AL		B
0CBUBDAX270A/	9-69	AD		B
0CBUBDBE200D/	9-73	AD		B
0CBUBDBM300D/	9-71	AC		B
0CBUBXAD2R0A/	9-70	AD		B
0CBUBXAD6R2C/	9-72	AD		B
0CBUBY0020AK/	9-22	AD		B
0CBUCB0199AZ/	9-29	AR		B
0CBUDA0128AK/	9-38	AD		B
0CBUDC0163CZ/	9-35	AG		B
"	9-36	AG		B
0CBUDC0232AK/	9-66	AF		B

PARTS CODE	No.	PRICE RANK	NEW MARK	PART RANK
0CBUEEC105CH/	9-44	AC		C
"	9-45	AC		C
0CBUEEC335CH/	9-43	AC		C
0CBUEFDR33DB/	9-52	AE		C
0CBUEXCAO000/	9-5	AB		C
0CBUEXCAS103/	9-64	AB		C
0CBUEXCAS152/	9-47	AB		C
"	9-56	AB		C
0CBUEXCAS154/	9-63	AB		C
0CBUEXCAS183/	9-48	AB		C
0CBUEXCAS184/	9-54	AB		C
0CBUEXCAS223/	9-58	AB		C
0CBUEXCAS273/	9-60	AB		C
0CBUEXCAS330/	9-49	AB		C
0CBUEXCAS331/	9-46	AB		C
0CBUEXCAS334/	9-57	AB		C
0CBUEXCAS390/	9-53	AB		C
0CBUEXCAS471/	9-51	AB		C
0CBUEXCAS472/	9-55	AB		C
"	9-61	AB		C
"	9-62	AB		C
0CBUEXCAS473/	9-50	AB		C
0CBUEXCAS822/	9-59	AB		C
0CBUEZ0507ZZ/	9-67	AD		B
0CBUFBA102FE/	9-68	AD		B
0CBUGAB101RV/	9-12	AF		C
0CBUGAC222VV/	9-9	AK		C
0CBUGAE561TS/	9-7	AH		C
0CBUGCM392BJ/	9-6	AF		C
0CBUGCU681BR/	9-14	AC		C
0CBUGCV102HZ/	9-3	AD		C
0CBUGFF223EH/	9-15	AC		C
0CBUGFF474JA/	9-8	AF		C
0CBUGFM224KR/	9-1	AF		C
0CBUGXAED104/	9-10	AC		C
0CBUGXAEF102/	9-13	AC		C
0CBUGXAEF222/	9-4	AC		C
0CBUGZ1041ZZ/	9-11	AF		C
0CBUGZ1072ZZ/	9-2	AN		C
0CBUKZ0826ZZ/	9-30	AK		C
0CBUZZ0156ZZ/	9-31	AN		C
0CB829655027/	9-65	BE		B

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